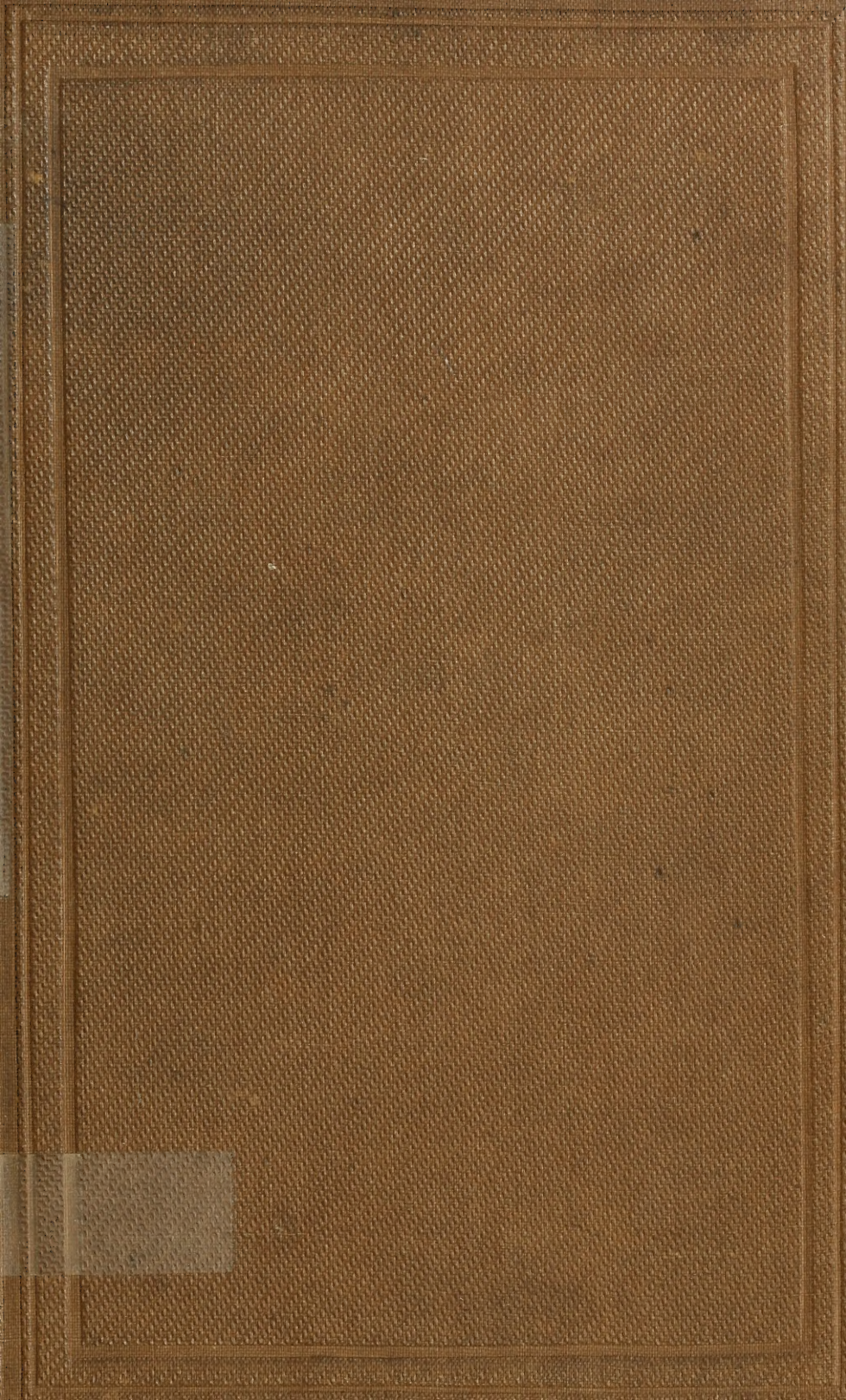






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CATALOGUE

OF THE

CHELONIANS,
RHYNCHOCEPHALIANS,

AND

CROCODILES

IN THE

BRITISH MUSEUM

(NATURAL HISTORY).

NEW EDITION.

BY

GEORGE ALBERT BOULENGER.

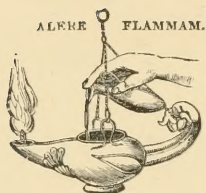


LONDON:

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1889.

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PREFACE.

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P 502

THE collection of Tortoises and Crocodiles in the British Museum was that part of the herpetological series to which the late Dr. Gray paid special and unremitted attention. Besides numerous papers which appeared in various periodicals, he prepared the following Catalogues for publication by the Trustees:—

1. Catalogue of Tortoises, Crocodiles, and Amphisbæniæ. 1844. 12° (pages 80).
2. Catalogue of Shield Reptiles. Part I. Testudinata. 1855. 4° (pages 79, with 50 plates). Part II. Emydosaurians, Rhynchocephalia, and Amphisbæniæ. 1872. 4° (pages 41, with woodcuts).
3. Supplement to the Catalogue of Shield Reptiles. Part I. Testudinata, with figures of the skulls of 36 genera. 1870. 4° (pages x and 120).
4. Appendix to the Catalogue of Shield Reptiles. Part I. Testudinata. 1872. 4° (pages 28).
5. Hand-List of the Specimens of Shield Reptiles. 1873. 8° (pages iv and 124).

1924

The collections made during the Transit of Venus Expedition and the opportune visits, in the year 1875, of British vessels to the Galapagos Islands furnished unequalled materials for the thorough examination of a group of Tortoises which previously had not been well understood. This examination was undertaken by myself, and the results were published by the Trustees in

6. The Gigantic Land-Tortoises (Living and Extinct). 1877. 4° (pages iv and 96, with 54 plates).
- Blossom expedition



In these works, however, there is great divergence as to the classification and nomenclature of the specimens, Dr. Gray, especially after he had commenced to study the configuration of the skulls, having introduced at successive periods numerous changes which cannot be maintained in the present state of our knowledge. Also the 'Hand-List' of 1873 has become antiquated, not only on account of the additions of more recent years, but also in consequence of the elimination of numerous duplicates which were transferred to other public Museums.

Thus it appeared desirable to prepare another issue of this 'Catalogue' on the plan of the new series of descriptive Catalogues of the Zoological Collections. Numerous woodcuts have been introduced, chiefly with the object of illustrating the principles adopted in the classification; all are taken from specimens in the Museum, but many have already appeared in Dr. Gray's papers in the 'Proceedings of the Zoological Society,' and are reproduced here by the kind permission of the Council of that Society.

ALBERT GÜNTHER,

*Keeper of the Department of Zoology.*

British Museum (N. H.),  
January 13, 1889.

## INTRODUCTION.

---

IN striking contrast with what has occurred in other groups of lower Vertebrates, the increase of known species of Chelonians has been very slight within the last twenty years. In fact, the present volume records a considerably smaller number of species than did the last-published treatise, viz. Dr. Gray's "Supplement to the Catalogue of Shield Reptiles," in 1870. This decrease is of course due to the different views held by the writers as to what deserve to constitute specific characters, and also, I trust, to a better understanding, at the present day, of the amount of variation within given forms. But the fact that hardly 20 valid species have been discovered since the close of Dr. Gray's labours shows that our knowledge of the existing Chelonians is far nearer completion than that of any other group of Reptiles, Crocodiles excepted.

Though deficient in novelties,—not a single new species or genus is established,—I trust that the present account will prove of interest for the thorough revision which higher and lower groups have undergone, and for the information it contains on the osteological characters, which have hitherto been much neglected. Figures of the skulls and shells (stripped of the epidermal shields, and showing the arrangement of the latter as well as of the underlying bony plates\*) are given for the principal genera. Although imperfect as regards the sutures and other details, the woodcuts of the skulls given by Dr. Gray in some of his papers are still useful to show the shape and general characters of the skulls, and therefore have been reproduced in the present volume. As to the original figures, which have been executed with great care, I hope they will prove welcome to palæontologists as well as to zoologists.

---

\* Crosses have been inserted in these figures to indicate the position of the axillary and inguinal buttresses of the plastron, which anchylose with the lower surface of the carapace.

The number of species of Chelonians, regarded as well established, amounts to 201. The Collection contains representatives of 176, the number of specimens being 1665. Gray's 'Hand-list,' issued in 1873, records 197 species and 1371 specimens. During the preparation of this Catalogue the series of skeletons has been greatly enlarged.

23 species of Emydosaurians appear to be well established, 18 of which are represented in the Collection by 236 specimens. Since the publication of the 'Hand-list,' in which 23 species and 304 specimens are enumerated, a number of defective or duplicate specimens have been eliminated; this accounts for the decrease in the number of specimens, as well as the fact that, through oversight, the same specimens were occasionally put down in the 'Hand-list' under different specific headings, and extracted skulls or other detached portions of one and the same individual were reckoned as so many specimens.

As in the other volumes of the Catalogues, the affixes to the names of Donors &c., in the third column of the list of specimens, may be explained as follows:—" [P.]" signifies "Presented by"; "[C.]" = "Collected by"; "[E.]" = "Obtained in exchange."

G. A. BOULENGER.

Department of Zoology,  
December 17, 1888.

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CATALOGUE  
OF THE  
CHELONIANS,  
RHYNCHOCEPHALIANS,  
AND  
EMYDOSAURIANS.

Order RHYNCHOCEPHALIA.

Rhynchocephalia, *Günther, Phil. Trans.* clvii. 1867.

Quadrate bone immovably united to cranial arches; two horizontal bony temporal arches. Dorsal ribs single-headed, articulating with the centrum and the neural arch. A well-developed sternal apparatus and a plastron, the latter formed of very numerous splint-like bones or "abdominal ribs," each composed of three pieces forming an obtuse angle directed forwards, and situated in the subcutaneous ligamentous tissue\*. Teeth present, not implanted in alveoli. Anal cleft transverse. Copulatory organs none.

The "Lizards" constituting this Order may be regarded as the most generalized of all recent and, perhaps, of all known Reptilia; in many points they approach the Stegocephalian Batrachians; it is possible that the common ancestors of the Chelonia, the Plesiosauria, and the Lacertilia would fall in this Order. The affinities of the Rhynchocephalia to the Chelonia are at least as great as to the Lacertilia. Only one species has survived to the present day, the *Sphenodon* of New Zealand, which is closely allied to, though less specialized than, the forms of the Trias: its claims to being the oldest existing Reptilian type are therefore unquestionable.

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\* It is noteworthy, as the fact does not appear to have been pointed out before, that the anterior extremity of the plastron overlaps the posterior extremity of the sternum.



Fam. 1. **HATTERIIDÆ.**

Hatteriidae, *Cope, Proc. Ac. Philad.* 1864.

Hatteriidae, *Günther, Phil. Trans.* clvii. 1867.

Sphenodontidae, *Cope, Proc. Amer. Assoc.* xix. 1870, p. 235.

Rhynchocephalidae, *Hoffmann, Bronn's Klassen u. Ordn. d. Thier.* 1883.

Sphenodontidae, *Huxley, Q. Journ. Geol. Soc.* xliii. 1887, p. 692.

Vertebrae amphicœlous, the centra conically excavated; intercentra present between the dorsal vertebrae; ribs with uncinate processes. Clavicles and interclavicle present. Limbs ambulatory; digits with not more than five phalanges; humerus with an entepicondylar and an ectepicondylar foramen. Premaxillaries distinct, beak-like, toothed, separating the nasal openings; parietals distinct; a parietal foramen; vomers distinct, in contact with the pterygoids; a large columella (epipterygoid). Dentition acrodont.

1. **SPHENODON.**

*Sphenodon*, *Gray, Zool. Misc.* p. 13 (1831), and *Cat. Sh. Rept.* ii. p. 30 (1872).

*Hatteria*, *Gray, Zool. Misc.* p. 72 (1842), and *Cat. Liz.* p. 249 (1845); *Günth. Phil. Tr.* clvii. p. 595 (1867).

*Rhynchocephalus*, *Owen, Tr. Geol. Soc.* vii. p. 83 (1845).

A single series of teeth on the outer border of the palatine, parallel with the maxillary, separated from the latter by a groove in which the edge of the mandible is received. One or two teeth occasionally present on the vomers. Body slightly compressed; tail long, strongly compressed. Limbs well developed; digits short, all clawed, webbed at the base. No ear-opening. Eye large, with vertical pupil. Scales of upper parts small, granular, intermixed with small tubercles; a nuchal, dorsal, and a low caudal crest; ventral scales large, squarish, arranged in transverse series\*.

New Zealand.

1. *Sphenodon punctatus* †.

*Sphenodon*, *Gray, l. c.*

*Hatteria punctata*, *Gray, ll. cc., and Zool. Ereb. and Terr.* pl. xx. (1845); *Günth. l. c.* pls. xxvi.-xxviii.

*Rhynchocephalus*, *Owen, l. c.* pl. vi. figs. 5-7.

\* The similarity of the integuments of *Sphenodon* and of a Chelonian (e. g. *Chelydra*) is very striking, especially if they be compared with those of an Agamoid Lacertilian.

† On various points of anatomy, cf.: Peters, *Mon. Berl. Ak.* 1874, p. 40; Albrecht, *Bull. Mus. Belg.* ii. p. 185, pl. viii. (1883); Bayer, *Sitzungsber. Ak. Wien*, xc. p. 237, pl. — (1884); Dollo, *Zool. Anz.* 1884, p. 548; Fürbringer, *Morphol. Jahrb.* xi. p. 484 (1885); Baur, *Am. Nat.* 1885, p. 1112, and 1886, pp. 733, 979, and *Zool. Anz.* 1886, p. 685.

*Sphenodon punctatum*, *Gray, Cat. Sh. Rept.* ii. p. 30 (1872); *Buller, Tr. N. Zeal. Inst.* ix. p. 317 (1876), and x. p. 222 (1877), and xi. p. 349 (1878); *Reischek, Tr. N. Zeal. Inst.* xviii. p. 108 (1885).

*Sphenodon guentheri*, *Buller, Tr. N. Zeal. Inst.* ix. p. 324; *Newman, Tr. N. Zeal. Inst.* x. p. 222 (1877).

? *Sphenodon diversum*, *Colenso, Tr. N. Zeal. Inst.* xviii. p. 118 (1885).

Olive or blackish, with small yellowish dots; lobes of nuchal and dorsal crest yellowish.

Total length 50 centim.

Small islands east of Northern Island.

|                                                    |                                 |                                                             |
|----------------------------------------------------|---------------------------------|-------------------------------------------------------------|
| <i>a.</i> Ad., spir.                               | Karewa, Bay of Plenty.          | Dr. Dieffenbach [P.]. (Type of <i>Hatteria punctata</i> .)  |
| <i>b.</i> Ad., spir.                               | Brothers Id., near Cook Strait. | { Sir W. Buller [P.]. (As typical of <i>S. guentheri</i> .) |
| <i>c.</i> Ad., skel.                               | Brothers Id., near Cook Strait. |                                                             |
| <i>d, e.</i> Ad., spir.                            | N. Zealand.                     | Capt. Drury [P.].                                           |
| <i>f.</i> Yg., spir.                               | N. Zealand.                     | Haslar Hospital.                                            |
| <i>g.</i> Ad., stflid. & skel.                     | N. Zealand.                     | Dr. F. Knox [P.].                                           |
| <i>h.</i> Ad., spir., dissected, & skull separate. | N. Zealand.                     | Sir A. Smith [P.].                                          |
| <i>i.</i> Ad., spir.                               | N. Zealand.                     |                                                             |
| <i>k.</i> Ad., skull.                              | N. Zealand.                     |                                                             |

## Order CHELONIA.

Cheloniens, *Brongniart, Bull. Soc. Philom.* ii. 1800.

Testudinata, *Oppel, Ordn. Rept.* 1811.

Quadrate bone immovably united to cranial arches. Dorsal ribs single-headed, the anterior attached between two vertebræ; body encased in a bony shell. A plastron formed of a small number of elements in addition to the clavicles. No sternum. No teeth; jaws covered with horny sheaths. Anal opening round or longitudinal. Copulatory organ present, single.

### Suborder I. ATHECÆ.

Vertebræ and ribs free, separated from a bony exoskeleton. Skull without descending processes of the parietal bones.

Fam. 1. **Sphargidæ.** Limbs paddle-shaped, clawless; phalanges without condyles. Exoskeleton consisting of numerous small bony plates arranged like mosaic.

### Suborder II. THECOPHORA.

Dorsal vertebræ and ribs immovably united and expanded into bony plates forming a carapace. Parietals prolonged downwards, forming a suture with the pterygoids, or separated from the latter by the interposition of the epipterygoid.

#### Superfam. A. CRYPTODIRA.

Neck bending by a sigmoid curve in a vertical plane; cervical vertebræ without or with mere indications of transverse processes; centrum of the last cervical articulating with the centrum of the first dorsal. Mandible with articular concavities; outer border of tympanic cavity deeply notched; pterygoids narrow in the middle, in contact on the median line. Pelvis not ankylosed to the carapace and plastron. Digits with not more than three phalanges. Epiplastra in contact with hyoplastra; entoplastron, if present, oval, rhomboidal, or T-shaped. A complete series of marginal bones, connected with the ribs.

I. Digits short or moderately elongate; phalanges with condyles; claws four or five. Neck completely retractile. Squamosal bone widely separated from the parietal.

A. Nuchal plate (bone) with costiform lateral processes, extending below the marginals.

Fam. 2. **Chelydridæ.** Caudal vertebræ mostly opisthocæalous; pubic symphysis widely separated from ischial.

Fam. 3. **Dermatemydidæ.** Caudal vertebræ procæalous; plastral bones nine; pubic symphysis widely separated from ischial.

Fam. 4. **Cinosternidæ**. Caudal vertebræ procœlous; plastral bones eight, the entoplastron being absent; pubic and ischial symphyses in contact, separating two foramens.

B. Nuchal plate without costiform processes; symphysial branches of pubis and ischium parallel, in contact or narrowly separated from each other.

Fam. 5. **Platysternidæ**. Caudal vertebræ mostly opisthocœlous.

Fam. 6. **Testudinidæ**. Caudal vertebræ procœlous.

II. Limbs paddle-shaped; phalanges without condyles; claws one or two. Neck incompletely retractile; cervical vertebræ short, mostly articulated by amphiarthrosis. Squamosal bone forming a suture with the parietal.

Fam. 7. **Chelonidæ**.

### Superfam. B. PLEURODIRA.

Neck bending laterally; cervical vertebræ with strong transverse processes, the cup-and-ball articulation single throughout; centrum of the last cervical articulating with the centrum of the first dorsal. Mandible with an articular condyle fitting into a concavity of the quadrate; outer border of tympanic cavity completely encircled by the quadrate; pterygoids very broad throughout, forming wing-like lateral expansions, and in contact on the median line. Pelvis ankylosed to the carapace and plastron. Digits with not more than three phalanges. Epiplastra in contact with hyoplastra; entoplastron oval or rhomboidal. A complete series of marginal bones, connected with the ribs.

Fam. 8. **Pelomedusidæ**. Plastral bones eleven, mesoplastra being present. Neck completely retractile within the shell.

Fam. 9. **Chelydidæ**. Plastral bones nine. Neck bending under the margin of the carapace, always exposed.

Fam. 10. **Carettochelydidæ**. Shell without epidermic shields. Limbs paddle-shaped, with only two claws.

### Superfam. C. TRIONYCHOIDEA.

Neck bending by a sigmoid curve in a vertical plane; cervical vertebræ without transverse processes; articulation between the last cervical and the first dorsal vertebra by the zygapophyses only. Mandible with articular concavities; outer border of tympanic cavity notched; pterygoids broad throughout, separated from each other, the basisphenoid joining the palatines. Pelvis not ankylosed to the carapace and plastron. Fourth digit with four or more phalanges. Epiplastra separated from the hyoplastra by the  $\wedge$ -shaped entoplastron. Marginal bones absent or forming an incomplete series, not connected with the ribs.

Fam. 11. **Trionychidæ**.



The external characters are of little avail as indicative of the relationships of the higher groups of Chelonians; and the characters on which the preceding synopsis is founded are mostly osteological. The following key is appended for the use of those not fully experienced in the "physiognomy" of Chelonians, who have not an opportunity of investigating the osteological characters; it is made up of readily ascertainable peculiarities, however trivial, and with its aid the family to which every known recent Chelonian belongs ought to be recognized without hesitation.

## I. Shell covered with epidermal, horny shields.

### A. Pectoral shields of plastron in contact with the marginals.

1. Plastral shields 11 or 12 .. **Testudinidæ**, p. 48.

2. Plastral shields 13, an intergular being present.

Neck retractile within the shell; no nuchal.

**Pelomedusidæ**, p. 191.

Neck constantly exposed; nuchal usually present.

**Chelydidæ**, p. 206.

### B. Pectoral shields widely separated from the marginals.

1. Tail more than half as long as the shell.

Plastron very small, cruciform ..... **Chelydridæ**, p. 19.

Plastron large ..... **Platysternidæ**, p. 45.

2. Tail not half as long as the shell.

*a.* Digits distinct, four or five clawed.

23 shields round the carapace and 4 or 5 on the anterior lobe of the plastron ..... **Cinosternidæ**, p. 33.

23 shields round the carapace and 2 or 3 on the anterior lobe of the plastron, or 25 marginals ..... **Dermatemydidæ**, p. 27.

*b.* Limbs paddle-shaped, with one or two claws.

**Chelonidæ**, p. 180.

## II. Shell without epidermal shields.

Limbs paddle-shaped, clawless ..... **Sphargidæ**, p. 7.

Limbs paddle-shaped, with two claws.. **Carettochelydidæ**, p. 236.

Digits distinct, claws three ..... **Trionychidæ**, p. 241.

## Suborder I. ATHECÆ.

- Euereta, part., *Stannius, Zoot. Amph.* 1854.  
 Chelonii, part., *Agassiz, Contr. N. H. U. S.* i. 1857.  
 Oiacopodes, part., *Gray, Suppl. Cat. Sh. Rept.* i. 1870.  
 Athecæ, *Cope, Proc. Amer. Assoc. Adv. Sc.* xix. 1870, p. 235; *Dollo, Bull. Mus. Belg.* iv. 1886, p. 91.  
 Dermatochelydæ, *Seeley, Q. Journ. Geol. Soc.* xxxvi. 1880, p. 412.  
 Paradiacostoidea, part., *Baur, Zool. Anz.* 1887, p. 99.

Vertebræ and ribs free, separated from a bony exoskeleton. Skull without descending processes of the parietal bones.

## Fam. 1. SPHARGIDÆ.

- Sphargidæ, *Gray, Ann. Phil.* (2) x. 1825.  
 Sphargidæ, *Bell, Zool. Journ.* iii. 1828.  
 Oiacopodes, part., *Wagler, Syst. Amph.* 1830.  
 Cheloniadæ, part., *Gray, Syn. Rept.* 1831.  
 Thalassites, part., *Duméril & Bibron, Erp. Gén.* ii. 1835.  
 Dermatochelydæ, *Fitzinger, Syst. Rept.* 1843.  
 Cheloniadæ, part., *Gray, Cat. Tort.* 1844, and *Sh. Rept.* i. 1855.  
 Sphargididæ, *Agassiz, Contr. N. H. U. S.* i. 1857.  
 Sphargidina, *Strauch, Chelonol. Stud.* 1862.  
 Sphargididæ, *Gray, Suppl. Cat. Sh. Rept.* i. 1870.

Exoskeleton consisting of mosaic-like juxtaposed plates. Plastral elements eight; no entoplastron. Limbs paddle-shaped, clawless, the digits of the fore limb much elongate; phalanges without condyles.

## 1. DERMOCHELYS.

- Dermochelys, *Blainv. Journ. de Phys.* lxxxiii. p. 259 (1816), and *Bull. Soc. Philom.* 1816, p. 111.  
 Sphargis, *Merrem, Tent.* p. 19 (1829); *Fitzing. N. Class. Rept.* p. 5 (1826); *Dum. & Bibr.* ii. p. 559 (1835); *Gray, Cat. Tort.* p. 51 (1844), and *Sh. Rept.* i. p. 71 (1855), and *Suppl.* p. 119 (1870).  
 Coriudo, *Fleming, Phil. Zool.* ii. p. 271 (1822).  
 Dermatochelys, *Wagler, Syst. Amph.* p. 133 (1830); *Strauch, Chelon. Stud.* p. 58 (1862); *Günth. Rep. Brit. Ind.* p. 55 (1864).

Dorsal shield completely, ventral shield incompletely, bony in the adult, the former with seven, the latter with five keels. Beak with two triangular cusps, between three deep notches; no enlarged alveolar surface, the jaws simply sharp-edged. Head covered with small shields.

Atlantic, Indian, and Pacific Oceans.

The vertebral column contains eight cervical, ten dorsal, two sacral, and eighteen to twenty caudal vertebræ. The neuro-central suture persists on all the vertebræ, save the hindermost caudals.

The cervicals are short and similar to those of the Chelonidæ. All the dorsal ribs except the last articulate with the neural arch and two centra; the first and tenth ribs are short. The caudal vertebræ are procœlous. Chevron bones are absent.

The dorsal shield consists of a mosaic of extremely numerous polygonal bony plates of unequal size, the largest forming seven longitudinal keels or ridges; it is produced into a pointed supra-caudal portion, which covers the tail. In the young the dorsal shield is soft and leathery. Between the shield and the last cervical vertebra a bone is present which is the homologue of the nuchal of other Chelonians.

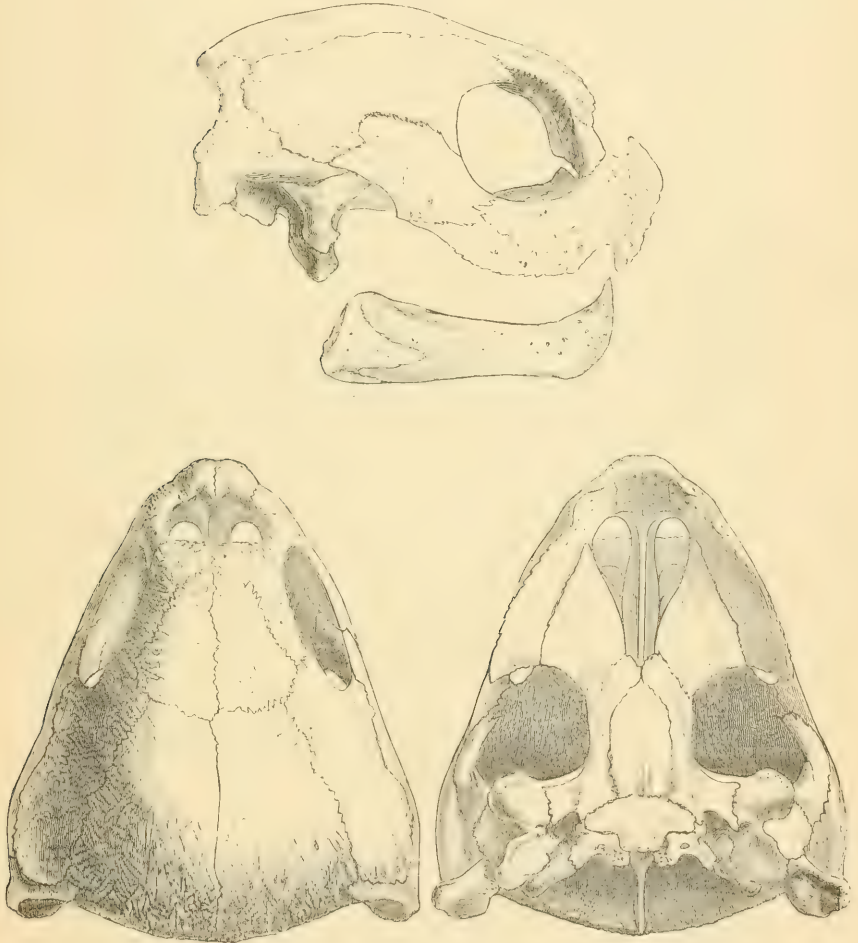
The ventral shield is similar to and continuous with the dorsal, and likewise bears ridges of enlarged tubercles; in the young both shields are extremely similar, but, with age, they differ in the ventral remaining soft, only the tubercles of the longitudinal ridges and a few others being bony. There is an underlying annulus of slender bones, eight in number—the plastral elements—viz. the epiplastra, the hyoplastra, the hypoplastra, and the xiphiplastra; an entoplastron or interclavicle is absent.

The skull bears a certain resemblance to that of *Chelone*, which is, however, limited to the shape and the general constitution of the temporal roof; in the absence of the column-like processes of the parietals descending to the pterygoids in front of the supraoccipital and the prootics, and in the opisthotic not coming in contact with the squamosal, it differs from that of all other Chelonians.

The external bony nostril is very large and situated entirely upon the upper surface of the skull, in front of the orbits; the choanæ are quite anterior, the nasal duct being nearly vertical, and are separated by the vomer, which also separates the palatines. The præmaxillaries are distinct; the præfrontals, which join the postfrontals, form a very short suture in front of the frontals. In one of the adult skulls in the British Museum, the lachrymals are nearly completely separated from the maxillaries; but this is merely an individual peculiarity. The parietals entirely or nearly entirely cover the supraoccipital; they form a long suture with the postfrontals, and a short one with the squamosals. The lower border of the postfrontal joins the jugal and the squamosal, and, contrary to what exists in the Chelonidæ, is separated from the quadratojugal by the two latter bones. The quadrate bone is a good deal within the outer border of the skull, and separates the opisthotic from the squamosal; the ear-chambers are open behind. The foramen magnum, which is deeper than broad, is bordered by the basi- as well as by the supra- and exoccipitals. The pterygoids are smaller than in any other Chelonian; they are nearly entirely separated from each other by the large basisphenoid, which extends forwards as far as the posterior borders of the orbits, and widely separated from the maxillaries by the palatines; their lateral borders are nearly straight, and without "cetopterygoid" processes; in front, they are in contact with the large palatines, behind with the quadrate and the basioccipital. The mandible has the same struc-

ture as in the Cryptodira; but in one adult skull the symphysial suture persists. The hyoid (according to Gervais) lacks the anterior cornua and the posterior are ossified proximally; the body is ossified in its posterior half, and a small ossification is present on each side in front of the cerato-hyals, which are large and bony.

Fig. 1.

Skull of *Dermochelys coriacea*.

The pectoral and pelvic girdles agree in all essential characters with the Chelonidæ; but the limbs, in spite of adaptive similarity, differ in important points:—Thus, in addition to the shape of the

humerus and the proportions of the phalanges, the fore limb differs in the radius and ulna being subequal in length and placed side by side in a horizontal plane, and in the fifth metacarpal, instead of the first, being the shortest; also in the absence of synovial articulations between the phalanges. Nine carpal bones, the centrale being present in the British Museum skeleton as well as in that figured by Gervais. Two tarsal bones in the proximal row, four in the distal (five in Gervais's figure).

### 1. *Dermochelys coriacea*.

*Testudo coriacea*, *Linn. S. N.* i. p. 350 (1766); *Schoepff, Test.* p. 123, pl. xxix. (1792); *Daud. Rept.* ii. p. 62, pl. xviii. fig. 1 (1802).

— *arcuata*, *Catesby, Nat. Hist. Carol.* ii. p. 40 (1771).

*Chelonia coriacea*, *Schweigg. Prodr.* p. 20 (1814).

*Sphargis mercurialis*, *Merr. Tent.* p. 19 (1820); *Schleg. Faun. Japon., Rept.* p. 6, pls. i.-iii. (1838).

*Coriuda coriacea*, *Harlan, Journ. Ac. Philad.* vi. p. 37 (1827).

*Sphargis tuberculata*, *Gravenh. Delic. Mus. Vratisl.* p. 9 (1829).

*Dermatochelys porcata*, *Wagl. Syst. Amph.* pl. i. figs. 1-23 (1830).

*Sphargis coriacea*, *Gray, Syn. Rept.* i. p. 51 (1831); *Dum. & Bibr.*

ii. p. 560, pl. xxiv. fig. 2 (1835); *Bell, Brit. Rept.* p. 11, fig. (1839);

*Bonap. Icon. Faun. Ital.* pl. — (1841); *Holbr. N. Am. Herp.* ii.

p. 45, pl. vi. (1842); *Gray, Cat. Tort.* p. 51 (1844), and *Sh. Rept.*

i. p. 71 (1855); *Agassiz, Contr. N. H. U. S.* i. p. 373 (1857);

*Gray, Suppl.* p. 119 (1870); *Gervais, N. Arch. Mus.* viii. p. 199,

pls. v.-ix. (1872); *Schreib. Herp. Eur.* p. 509 (1875); *Garman,*

*Bull. U. S. Nat. Mus.* no. 25, p. 303 (1884); *McCoy, Prodr. Zool.*

*Vet.* pls. xlii. & xliii. (1885).

*Dermatochelys coriacea*, *Strauch, Chelon. Stud.* p. 180 (1862), and *Verth. Schildkr.* p. 133 (1865); *Günth. Rept. Brit. Ind.* p. 55 (1864).

Fore limbs as long as the dorsal shield in the young, shorter in the adult. Colour dark brown, uniform or spotted with yellow; the longitudinal series of enlarged tubercles and the border of the limbs yellowish in the young.

The largest specimen in the collection is nearly 2 metres long.

Generally distributed between the tropics; an accidental visitor to the temperate coasts.

a. Ad., stffid. Coast of Dorsetshire.

b. Ad., skel. Atlantic Ocean.

c. Ad., stffid. Cape of Good Hope.

d. Ad., stffid. Muscat, Arabia.

e. Ad., skull. Solomon Islands.

f, g. Yg., spir. — ?

h. Yg., skel. — ?

Sir A. Smith [P.].

A. S. G. Jayakar, Esq. [P.].

C. M. Woodford, Esq. [C.].



## Suborder II. THECOPHORA.

Thecophora, *Dollo, Bull. Mus. Belg.* iv. 1886, p. 91.

Dorsal vertebræ and ribs immovably united and expanded into bony plates forming a carapace. Parietals prolonged downwards, forming a suture with the pterygoids or separated from the latter by the interposition of the epipterygoid.

## Superfam. A. CRYPTODIRA.

Chelonii, part., Amydæ, part., *Oppel, Ordn. Rept.* 1811; *Agassiz, Contr. N. II. U. S.* i. 1857.

Testudinea, Emydea streptopelyca, Euereta, part., *Stannius, Zoot. Amph.* 1854.

Tylopoda, Steganopodes, Oiacopodes, part., *Gray, Suppl. Cat. Sh. Rept.* i. 1870.

Cryptodira, part., *Cope, Proc. Amer. Assoc. Adv. Sc.* xix. 1870, p. 235.

Peltochelyidæ, part., *Seeley, Q. Journ. Geol. Soc.* xxxvi. 1880, p. 412.

Dactylosterna, part., Clidosterna, Lysosterna, *Cope, Proc. Amer. Philos. Soc.* xx. 1882, p. 143.

Dactyloplastræ, part., Clidoplastra, Lysoplastra, *Dollo, Bull. Mus. Belg.* iv. 1886, p. 91.

Paradiacostoidea, part., *Baur, Zool. Anz.* 1887, p. 99.

Neck bending by a sigmoid curve in a vertical plane; cervical vertebræ without or with mere indications of transverse processes; centrum of the last cervical articulating with the centrum of the first dorsal. Mandible with articulatory concavities; outer border of tympanic cavity incompletely bony; pterygoids narrow in the middle, in contact on the median line. Pelvis not anchylosed to the carapace and plastron. Digits with not more than three phalanges. Epiplastra in contact with hyoplastra; entoplastron, if present, oval, rhomboidal, or T-shaped. A complete series of marginal bones, connected with the ribs.

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The following is a brief sketch of the Osteology of the Group.

DORSAL VERTEBRAL COLUMN AND CARAPACE.—There are ten dorsal vertebræ, the first and last of which have no share in the formation of the dorsal shield. The first has a short depressed centrum, concave anteriorly, with strong præzygapophyses articulating with the postzygapophyses of the last cervical; it bears a short rib anteriorly, which is connected with the second rib, and, in a few genera (*Kachuga, Batagur, Callagur, Hardella*), also with the ascending

axillary buttress of the plastron; this first rib is considerably more elongate in the Chelydridæ. From the second to the eighth vertebra inclusive the centra, which have flattened articular faces, are connected by suture with the neural arches, which expand into bony (neural) plates alternating with the centra, and with strong ribs which, at a short distance from their attachment (between centrum and arch), expand into large bony (costal) plates suturally united with the neural plates. The neural spine may be low or obsolete, or more elevated, in which case it is reduced to a narrow septum pierced with fontanelles; the latter being special to adult specimens of the genus *Testudo*. The "capitular" extremity of the second rib articulates between the first and second centra, and so do, as a rule, the third and fourth; but the following generally shift back so as to articulate with the middle of the posterior centra. In very old specimens it not unfrequently happens that the costal "capitula" become atrophied or disappear altogether. The tenth vertebra forms the counterpart of the first: the centrum is very short, with a posterior condyle, and a short rib which may (in *Chelydra* and *Platysternum*) abut on the eighth rib in the same manner as the first does on the second; but, as a rule, it differs little in appearance from the penultimate dorsal and the following sacral. With the exception of the first and hindermost, the centra are longer than broad: they may be flattened inferiorly (second vertebra of most Emydines, second to fourth or fifth of Chelydridæ), feebly compressed, or strongly compressed and forming a keel (*Dermatemys*, *Batagur*, *Chrysemys*, *Testudo*).

In front of the series of neural plates is a large plate, the nuchal, situated above the first dorsal vertebra: this plate, which is present in all Chelonians, is a cartilage bone, developed simultaneously with the neural plates; the fact that it is connected, by ligament, with the last cervical vertebra, and that it assumes on each side, in the Chelydridæ, the form of a rib, suggests the possibility of its representing, in part at least, the modified ribs of the last cervical. Such rib-like processes are also present, well developed in the young and shorter in the adult, in the *Dermatemydidæ* and *Cinosternidæ*, underlying the first or first two marginals; in *Chelydra* and *Macrolemmys* the rib-like process extends to below the third marginal and abuts on the distal end of the first costal. A mere indication of this process is found in some young specimens of *Emys orbicularis* and other Emydines. The nuchal is six-sided and broader than long\*.

There are normally eight neural plates. In a few genera, however (*Dermatemys*, *Staurotypus*, *Cinosternum*, *Cistudo*), the series is reduced by one to three of the hindermost, and the corresponding last or last two or three pairs of costal plates meet in a suture on

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\* A fossil *Chelydra* (*Chelydropsis*, C. Peters) has been described as having two nuchals; but that such is due to an anomalous transverse division, I have little doubt.

the median line. In a specimen of *Cinosternum alboquadratum*, the first neural plate is also absent. The shape of the neural plates affords good generic characters. They may be tetra-, hexa-, or octagonal; they may be all similar in shape (hexagonal), or hexagonal plates may alternate with octagonal, or tetragonal with octagonal (e. g. *Testudo*). When hexagonal, their lateral sides may be of equal or subequal length (e. g. some *Chelonidæ*), or the antero-lateral (e. g. *Emys*) or the postero-lateral (e. g. *Cyclemys*) the shorter; the hindermost plates are as a general rule short-sided in front; the first is, with few exceptions, tetragonal. It not unfrequently happens for one or more of the neural plates to split up into two or three, or for two to amalgamate into one, but such are usually easily recognized as anomalies.

The costal plates number eight on each side\*. In the newly-hatched young they are scarcely developed, and the ribs do not come into contact with one another; ossification starts a short distance from the neural plate and soon works up towards the latter; but it takes some considerable time until it reaches the distal extremity, a stage which is attained but late in life in *Chelydra* and *Macroclémmys*, and very late or perhaps never in the marine Turtles. In *Batagur* small fontanelles persist between the marginals and costals in specimens which have nearly attained full size. As a rule, the carapace of land Tortoises ossifies more rapidly than that of freshwater. The distal extremity of the rib persists as a free point fitting into a corresponding socket in the marginal plate. The first costal plate is constantly the broadest (perpendicularly to the axis), the last the smallest; in *Cinosternum* the latter is unusually small and destitute of the distal point. In *Testudo*, *Homopus*, and *Cinixys*, and to a lesser degree in a few freshwater Tortoises, especially old individuals, these plates are unequal in width, alternately widening proximally and narrowing distally.

Continuing the series of the neural plates are two to four azygous membrane bones termed the pygal plates, the last of which, in shape and position, forms part of the marginal series; this distinction is most obvious in immature *Chelonidæ*, the azygous marginal being separated from the true pygals by an interspace.

In *Thalassochelys* usually and in *Chelone* exceptionally, the last pair of costals meets on the middle line, between the last neural and the anterior pygal, of which two or three are present besides the azygous marginal.

In addition to the azygous posterior marginal, there are eleven (exceptionally twelve) marginal plates on each side, except in *Staurotyphlus* and *Cinosternum*, which have only ten.

PLASTRON.—The plastron is composed of nine bones †, viz. an

\* Nine or ten in some fossil marine forms.

† In the fossil *Baenidæ* an additional bone (*mesoplastron*) is present on each side, between the hyo- and the hypoplastron.

entoplastron, and, on each side, an epiplastron, a hyoplastron, a hypoplastron, and a xiphiplastron. The epiplastra may be regarded as the homologues of the clavicles, the entoplastron of the interclavicle, and the other elements as a modification of the Stegocephalian and Rhynchocephalian "abdominal ribs." The entoplastron is absent in the Cinosternidæ, even at birth. In the early stage of life, the shape of the epiplastra and entoplastron are highly suggestive of their homologues in other Reptiles and Stegocephalians, and the paired abdominal bones are separated by wide fontanelles. This embryonic condition is retained until late in life in the Chelydridæ and throughout in the Chelonidæ, whilst in all other recent Cryptodira the plastron forms in the adult a solid shield, which may be divided into two or three portions by the presence of one or two transverse ligamentous hinges, as in *Cistudo*, *Emys*, *Cyclemys*, and *Cinosternum*. It is well to state, for the fact has often been overlooked, or even denied, that this hinge is developed with age, the more distinct the older the specimen; it is absent, or very indistinct, in quite young specimens. In the adult of most genera the hyo- and hypoplastra are united with the marginal plates by suture; in a few (*Cistudo*, *Emys*, *Cyclemys*, *Platysternum*) they are narrowly separated from the latter by ligament, the plastron being movable upon the carapace; or the outer border of these bones form digitate dentations, which may either articulate by gomphosis with the marginals (Chelydridæ) or be entirely free (Chelonidæ). The space between the body of the plastron and the marginals is called the bridge; it is particularly short or absent in those Testudinidæ in which the plastron is movable, and long and narrow in those forms (Chelydridæ and *Staurotypus*) in which the plastron is particularly small, the whole shield being cruciform. In such Testudinidæ as have the plastron suturally united with the carapace, the hyo- and hypoplastron each send up a process, respectively termed the axillary and inguinal buttress, which anchylose either with the inner surface of the marginals or with the costals; these buttresses are least developed in the land Tortoises and most in the Testudinidæ frequenting deep water (*Batagur*, *Kachuga*, *Callagur*, and *Hardella*), in which genera they form very large septa nearly reaching the vertebral region and forming two lateral chambers occupied by the lungs, which are particularly developed in correlation with the diving powers.

In the embryonic stage the entoplastron or interclavicle is constantly longer than broad, rhomboidal or T-shaped, terminating posteriorly in a sharp point which persists, as a more or less elongate spine, on the inner surface of the plastron, in the adult of all Testudinidæ except *Cyclemys*, *Geoemyda*, and *Nicoria*, in which it is usually totally absent. The entoplastron is dagger-shaped in *Chelone mydas*. The shape and connections of the plastral bones in newly-hatched Cryptodira vary considerably according to the genera. The hyoplastra are widely separated from the hypoplastra in the land Tortoises, and in contact in the aquatic, broadly in *Emys*, as

in the Chelydridæ and Cinosternidæ, narrowing in most other genera, in which each of these bones forms three diverging branches. The hyoplastra are constantly in contact with the epiplastra, and so are the hypoplastra with the xiphiplastra. It is to be noted that the axillary and inguinal buttresses, when present, ossify very early, and are nearly as much developed in the young as in the adult.

**CERVICAL VERTEBRÆ.**—The cervical vertebræ, which number eight as in all Chelonia, present this peculiarity, that their centra exhibit the four modes of articulation, some being concavo-convex, others convexo-concave, others biconvex, others biconcave. A single exception is known, *Pyxis*, in which they are all proœlous in the specimen examined by Vaillant, as well as in the one in the British Museum. But the mode of articulation varies considerably in certain of the median vertebræ, not only according to species, but even sometimes according to individuals. With the exception noticed above, the first vertebra is biconcave; the last is biconvex, and the penultimate biconcave in the Testudinidæ and Platysternidæ; the last four are proœlous in the Chelydridæ, Dermatemnidæ, Cinosternidæ, and Chelonidæ. The articulation between two or more of the posterior centra is by means of two condyles fitting into two sockets, and this ginglymoid articulation, which is opposed to any lateral movements, is diagnostic of the Cryptodira as contrasted with the Pleurodira. Transverse processes are absent or merely indicated\*. The centrum of the first vertebra (odontoid bone) is constantly distinct from the three elements (hypapophysis and neurapophyses) which articulate with the skull. Hypapophyses may be present between some of the vertebræ, single between the first and second, in pairs between the others (*Emys*, *Clemmys*, *Chelone*). In old age these ossifications may coalesce with the posterior inferior border of the centra†.

**SACRAL AND CAUDAL VERTEBRÆ.**—The sacral vertebræ are two in number, their centra are biplane. The ribs are, as on the last dorsal vertebræ, suturedly united with both centrum and neural arch; the first is the most developed, considerably expanded distally. The sacral ribs are strongest in the Chelydridæ and Chelonidæ, weakest in the terrestrial Testudinidæ.

The caudal vertebræ, as far as my experience goes, range in number from 16 (*Cistudo*) to 35 (*Chelydra*, *Emys orbicularis*); the more usual number being from 20 to 25. The comparative length of the tail is not indicative of the number of vertebræ; it is also remarkable that the two extreme numbers occur in two closely

\* C. K. Hoffmann regards these "paradiapophyses" as rudimentary ribs; in embryos there is an autogenous ossification between the neural arch and the centrum. In the adult Chelonidæ, in which the neuro-central suture persists very distinct throughout life, the rib is represented by a cartilaginous tubercle.

† For fuller details on the cervical vertebræ, cf. Vaillant's excellent memoir in Ann. Sc. Nat. x. 1880.



allied genera (*Cistudo* and *Emys*). The centra are procœlous, except in the Chelydridæ and Platysternidæ; in *Chelydra* and *Macrolemmys* the two or three anterior are procœlous, the next biconvex, the rest opisthocœlous; in *Platysternum* the last ten are again procœlous. Transverse processes or costoids are present on most of the vertebræ and connected with the centrum and the arch. Neural spines are not developed. Chevron bones are absent, or vestigial, except in the Chelydridæ and Platysternidæ, which have them well developed, and mostly intervertebral, although pertaining more to the posterior part of the centrum than to the anterior part of that following.

SKULL.—The skull of all Cryptodira is comparatively very convex, mostly so in the Chelonidæ and terrestrial Testudinidæ, least in the Chelydridæ. The deeper the skull the larger the orbits; however, in the Chelonidæ the orbits, which are enormous in the young and half-grown, are comparatively small in old age. The orbit is completely encircled by four or five bones, viz. the maxillary, the præfrontal (the frontal), the postfrontal, and the jugal; in *Platysternum* alone the jugal is excluded, and, the præfrontal forming a suture with the postfrontal, only three bones enter the orbit. The bony external nostril is single, bounded by the præmaxillaries, which are constantly distinct, the maxillaries, and the præfrontals; the frontals and the parietals are also distinct. The latter bones send down a prolongation to the pterygoid, from which it is usually separated by a small scale-like bone, the homologue of the columella or epipterygoid. The postfrontals are large in most genera, small and forming a narrow postorbital arch in most land Tortoises, especially in *Pyxis*, in which it is extremely slender; this postorbital arch is comparatively broad in other Testudinidæ, and in the Dermatemydidæ and Cinosternidæ; and in the Chelydridæ, Platysternidæ, and Chelonidæ the postfrontal unites in a long suture with the parietal, the whole or greater part of the temple being covered by a bony roof.

The cranial arches of other "Monimostylicate" Reptiles, viz. the postfronto-squamosal, the quadrato-jugal, and the parieto-squamosal, are all three represented only in the Chelonidæ, in which the temporal roof reaches its greatest development. In all other Cryptodira the parietal is widely separated from the squamosal. In some genera (*Chelydra*, *Macrolemmys*, *Platysternum*, *Emys*, *Chrysemys*, *Bellia*, *Malacoclemmys*, *Ocadia*) the two lateral arches are represented in the "zygomatic" arch, whilst in all others the squamosal is separated from the postfrontal, so that the lower only is represented; in a few (*Geoemyda*, *Cistudo*) there is no bony temporal arch, and the quadrato-jugal is rudimentary or absent. In *Staurotypus*, *Cinosternum*, and *Platysternum* the maxillary forms a suture with the quadrato-jugal.

The supraoccipital forms a crest which is produced beyond a line drawn between the posterior extremities of the squamosals. The foramen magnum is deeper than broad and bounded by the supraoccipital and the exoccipitals, and in *Chelone* and *Thalassochelys*

also by the basioccipital. The three elements are usually distinct in the occipital condyle.

The outer border of the tympanic cavity is never completely encircled by bone, at least a wide notch being present in the tympanic frame of such forms (the Chelydridæ, Platysternidæ, and land Tortoises) as have the outer ear-chamber closed behind; in other forms, especially the marine Turtles, the stapes are completely, or nearly completely, exposed behind. In the Chelonidæ, Chelydridæ, Dermatemydidæ, Cinosternidæ, and Platysternidæ the tympanic frame is not formed by the quadrate alone, as in the Testudinidæ, but also by the squamosal and the quadrato-jugal.

The palatal surface is characterized by the comparative narrowness of the pterygoids, the outer borders of which are concavely arched or convergent behind a more or less distinct process which apparently answers to the ectopterygoid process of the Rhynchocephalia and Lacertilia; this character is most marked in *Macroclermys*, least in the land Tortoises. In the latter the palate is deeply concave, and the vomer develops a more or less strong median keel or ridge which, in *Testudo polyphemus* and *calcarata*, is produced far back between the pterygoids. A foramen, analogous to the palato-pterygoid, is present in all forms save the Chelonidæ. The basisphenoid is separated from the quadrate by the pterygoids, which form a suture with the basioccipital, or very nearly reach the latter bone, and are in contact with the maxillaries (except in the Chelonidæ); the vomer, which is single, forms a septum between the choanæ, and joins the præmaxillaries on the palate, separating the maxillaries (except in some specimens of *Thalassochelys*).

The mandible contains a single dentary and five paired elements, viz. the coronoid, the opercular, and the angular on the inner side, the supraangular on the outer side, and, between the opercular and the supraangular, the articular, which is small and with a concave surface.

HYOID ARCH.—The body is short, ossified in one, three, or four parts in the freshwater forms; entirely cartilaginous or with two or four small ossifications in the terrestrial and marine. The entoglossal, which is situated below the anterior extremity of the body of the hyoid, is small and cartilaginous. In most freshwater Cryptodira three pairs of cornua are present—the anterior very small and cartilaginous, the median largest, bony, and with a cartilaginous epiphysis, the posterior similar to the median but shorter; in the Chelonidæ there are likewise three pairs of cornua, but the posterior are cartilaginous; in the land Tortoises and in *Nicoria* there are no distinct anterior cornua, and the posterior are but cartilaginous.

PECTORAL ARCH AND FORE LIMB.—Of the three branches which constitute the pectoral arch, viz. the scapula, the præcoracoid, and the coracoid, the latter is the longest in the Chelonidæ, the former in all other Cryptodira. In the land Tortoises the coracoid is much expanded, subtriangular, its width nearly equalling its length. The

humerus is nearly straight in the Chelonidæ, more or less strongly curved in the other families. The radius and ulna are subequal in length, except in the Chelonidæ, where the former is much longer and situated below the ulna and the intermedium carpi. In the terrestrial and marine Chelonians, the radius and ulna are in contact distally; they are separated by the intermedium in most freshwater forms.

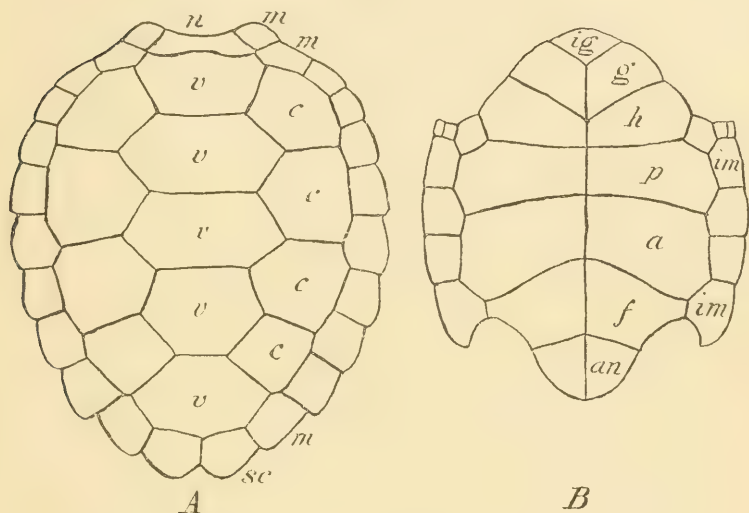
The carpus, in the embryo, contains nine elements, viz. the radiale, intermedium, ulnare, centrale, and five bones in the second row. All these persist distinct in the Chelydridæ, Dermatemydidæ, Platysternidæ, Chelonidæ, and a few Testudinidæ (*Damonina*, *Malacoclemmys*); in most Testudinidæ the radiale coalesces with the centrale, and the carpals of the second row may be reduced to four by fusion of two elements. A pair of additional bones, one on the inner and one on the outer side, are present in *Emys*, *Cistudo*, *Geomyda*, and *Nicoria*. In *Chelone* the outer of these additional bones is larger than, and on a line with, the other carpals of the second row. The number of phalanges is 2.3.3.3.3 in the Chelydridæ, Dermatemydidæ, Cinosternidæ, Platysternidæ, and some Testudinidæ (*Batagur*, *Hardella*, *Morenia*, *Damonina*, *Bellia*); 2.3.3.3.2 in most freshwater Testudinidæ and the Chelonidæ; 2.3.3.2.2 in *Cistudo*; and 2.2.2.2.2 or 2.2.2.2.1 in *Testudo* and allies.

PELVIS AND HIND LIMB.—The ilium is loosely attached to the sacrum and to the eighth costal plate. The pubis and ischium form a ventral symphysis, and their symphyseal branches are either widely separated from each other, merely connected by a ligamentous or cartilaginous band (Chelydridæ, Dermatemydidæ, Chelonidæ), or in contact and limiting two obturator foramina (Cinosternidæ, Testudinidæ). The pubis sends off a more or less developed process, directed forwards and outwards, which may be subcylindrical, rod-like, or flat and expanded distally; a lateral process is also present, but usually less developed than that of the pubis, in the ischium of all Cryptodira except the Chelonidæ. An epipubic ossification is present in adult specimens of *Macrochelys* and *Dermatemys*.

The tarsus contains two bones in the proximal row, viz. a large inner (tibiale+intermedium), in contact with both tibia and fibula, and a smaller outer (fibulare); a centrale is distinct only in the Chelydridæ; the distal row contains five bones (if, following Hoffmann, we reckon as such the outer, larger bone which is regarded by most authors as the fifth metatarsal), except in the Chelonidæ, where only four are present. The phalanges number 2.3.3.3.2 or 1 in most Cryptodira; 2.3.3.3.3 in *Batagur*, *Kachuga*, and *Hardella*; 2.3.3.3.0 in *Cistudo*; and 2.2.2.2.0 in *Testudo*, *Homopus*, *Pyxis*, and *Cinixys*.

The following figure refers to the terminology of the epidermal shields of the shell.

Fig. 2.

*Chelone mydas.*

A. Carapace.

B. Plastron.

a. Abdominal.  
an. Anal.  
c. Costal.  
f. Femoral.  
g. Gular.

h. Humeral.  
ig. Intergular.  
im. Inframarginal.  
m. Marginal.

n. Nuchal.  
p. Pectoral.  
sc. Supracaudal.  
v. Vertebral.

## Fam. 2. CHELYDRIDÆ.

Emydidae, part., *Gray, Ann. Phil.* (2) x. 1825.

Emydidae, part., *Bell, Zool. Journ.* iii. 1828.

Steganopodes, part., *Wugler, Syst. Amph.* 1830.

Emydæ, part., *Gray, Syn. Rept.* 1831.

Elodites Cryptodères, part., *Duméril & Bibron, Erp. Gén.* ii. 1835.

Emydidae, part., *Gray, Cat. Tort.* 1844, and *Sh. Rept.* i. 1855.

Chelydroidæ, *Agassiz, Contr. N. H. U. S.* i. 1857.

Chersemyda, part., *Strauch, Chelon. Stud.* 1862.

Chelydridae, part., *Gray, Suppl. Cat. Sh. Rept.* i. 1870.

Chelydrinæ, part., *Cope, Proc. Ac. Philad.* 1872, p. 22.

Chelydridae, part., *Cope, Proc. Am. Philos. Soc.* xx. 1882, p. 144.

Nuchal plate with long costiform processes, underlying the marginals. Plastral bones nine. Shell covered with epidermal shields. Caudal vertebræ mostly opisthocœlous. Neck completely retractile

within the shell. Temporal region incompletely roofed over; no parieto-squamosal arch. Digits moderately elongate; phalanges with condyles; claws four or five.

The two closely allied genera which constitute this family agree in the following characters:—

Carapace comparatively small, with serrated posterior border; neural plates broader than long, forming a complete series; one or two pygals; twenty-three marginal plates. Plastron small, cruciform, articulating with the carapace by gomphosis. The shell attains complete ossification but late in life. Abdominal shields not meeting on the median line, separated from the marginals by a series of inframarginals. Head large, incompletely retractile; jaws strongly hooked. Chin with one or more pairs of small dermal appendages. Digits webbed. Fingers all clawed, outer toe clawless. Tail long, crested above. Cervical vertebræ: second and third opisthocœlous, fourth amphicyrtous, rest procœlous.

### 1. CHELYDRA.

- Chelydra*, *Schweigg. Prodr.* p. 23 (1814); *Fitzing, N. Class. Rept.* p. 6 (1826); *Wagler, Syst. Amph.* p. 136 (1830); *Gray, Cat. Tort.* p. 34 (1844), and *Sh. Rept.* i. p. 48 (1855); *Agassiz, Contr. N. H. U. S. i.* p. 416 (1857); *Strauch, Chelon. Stud.* p. 36 (1862); *Gray, Suppl. Cat. Sh. Rept.* i. p. 64 (1870).  
*Chelonura*, *Fleming, Phil. Zool.* ii. p. 270 (1822).  
*Rapara*, *Gray, Ann. Phil.* (2) x. p. 211 (1825).  
*Sauroidelys*, *Latr. Fam. Nat. R. A.* p. 92 (1825).  
*Cheliurus*, *Rafin. Atlant. Journ.* p. 64 (1832).  
*Emysaurus*, *Dum. & Bibr. ii.* p. 548 (1835).  
*Chelonura*, part., *Holbrook, N. Am. Herp.* i. p. 139 (1842).

No supramarginal shields. Orbit directed outwards and upwards. Tail with large shields inferiorly.

North America to Ecuador.

#### 1. *Chelydra serpentina*.

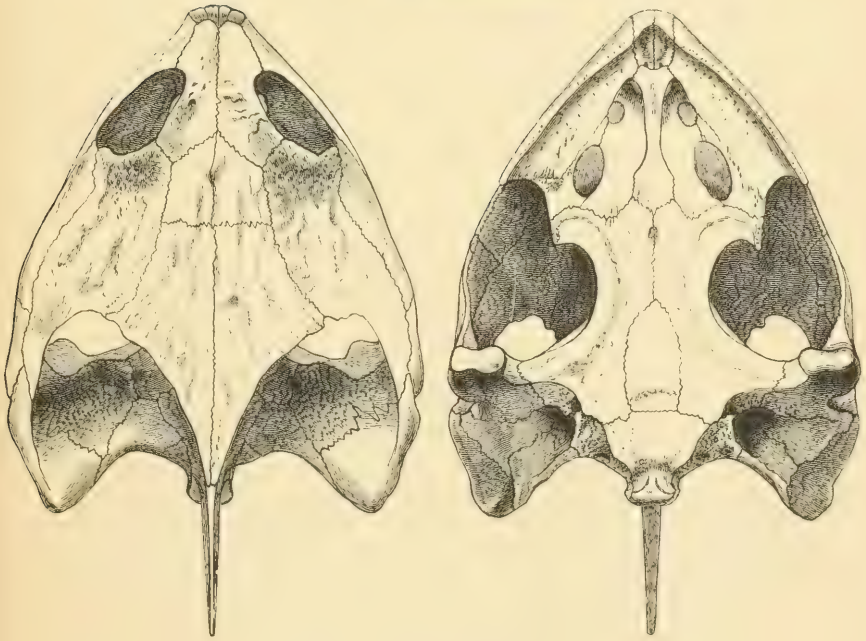
- Testudo serpentina*, *Linn. S. N. i.* p. 354 (1766); *Schneid. Schildkr.* p. 337 (1783); *Schœffig, Test.* p. 28, pl. vi. (1792); *Daud. Rept.* ii. p. 98, pl. lxxxvi. fig. 2 (1802); *Leconte, Ann. Lyc. N. Y.* iii. p. 127 (1830).  
*Chelydra lacertina*, *Schweigg. Prodr.* p. 23 (1814).  
 — *serpentina*, *Schweigg. l. c.* p. 24; *Wagl. Syst. Amph.* p. 136, pl. v. figs. 46 & 47 (1830); *Gray, Cat. Tort.* p. 34 (1844), and *Sh. Rept.* i. p. 48, pls. xxxviii. fig. 1, & xl. fig. 2 (1855); *Agassiz, Contr. i.* p. 417, pl. iv. figs. 13–16, & pl. v. figs. 18, 19 (1857); *Peters, Mon. Berl. Ac.* 1862, p. 627; *Strauch, Chelon. Stud.* p. 139 (1862); *Cope, Proc. Ac. Philad.* 1872, p. 23.  
*Emys serpentina*, *Merr. Tent.* p. 23 (1820).  
*Chelonura serpentina*, *Fleming, Phil. Zool.* ii. p. 270 (1822); *Holbr. N. Am. Herp.* i. p. 139, pl. xxiii. (1842); *De Kay, N. York Faun., Rept.* p. 8, pl. iii. fig. 6 (1842); *Wied, N. Acta Ac. Leop.-Carol.* xxxii. i. p. 47 (1865).  
*Rapara serpentina*, *Gray, Ann. Phil.* (2) x. p. 211 (1825).



*Emysaura serpentina*, *Dum. & Bibr.* ii. p. 350, pl. xvii. fig. 1 (1835);  
*A. Dum. Cat. M  th. Rept.* p. 15 (1851); *Bocourt, Miss. Sc. Mex.,*  
*Rept.* pl. v. fig. 1 (1870).  
*Chelydra emarginata*, *Agassiz, l. c.* p. 417 (1857).

Carapace rugose and with three tubercular keels in the adult and

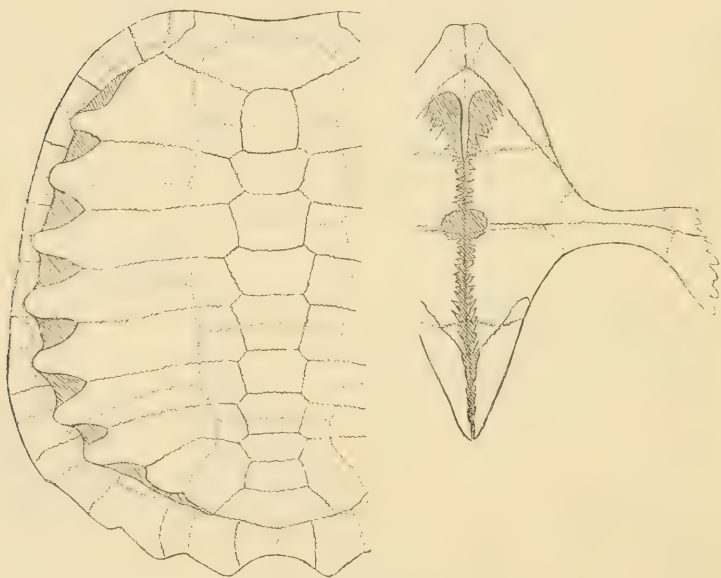
Fig. 3.



Skull of *Chelydra serpentina*.

halfgrown, becoming gradually smoother with age. Vertebral shields much broader than long, at least three fourths the width of the costals. Plastron with angular lobes; bridge very narrow, somewhat variable in width, but never more than one tenth of the length of the plastron\*; the hypoplastral bones enter for a much greater part in the formation of the bridge than the hyoplastra, the outer, digitate portion of which is scarcely expanded. A series of two or three inframarginals separates the marginals from the abdominal, the transverse diameter of which equals at least twice the

Fig. 4.

Shell of *Chelydra serpentina*.

longitudinal. Snout short and pointed; interorbital space narrow. Skin very warty; a pair of very small barbels on the chin. Tail nearly as long as, or longer than, the carapace in the young, two thirds or three fourths that length in the halfgrown and adult; a strong crest of large compressed tubercles along its upper surface; a series of large divided scutes along its lower surface.

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\* From what is known to be the case in *Staurotypus*, we may conclude that the specimens with broader bridge are females.

The largest specimen in the Collection measures :—Head and neck 25 centim., carapace 35, tail 30.

North America, east of the Rocky Mountains, from Canada to Mexico ; Ecuador.

|                                    |                           |                                                          |
|------------------------------------|---------------------------|----------------------------------------------------------|
| <i>a.</i> Ad., stfñd.              | Lake of Woods.            | G. M. Dawson, Esq.<br>[C.] Brit. N. A.<br>Boundary Comm. |
| <i>b.</i> Hgr., stfñd.             | Grosse Id., Michigan.     | Smithsonian Inst.                                        |
| <i>c.</i> Hgr., spir.              | Grosse Id., Michigan.     | Smithsonian Inst.                                        |
| <i>d.</i> Hgr., spir.              | Bloomington, Indiana.     | C. H. Bollman, Esq.<br>[C.]                              |
| <i>e.</i> Yg., spir.               | Meadville, Pennsylvania.  | Smithsonian Inst.                                        |
| <i>f.</i> Head, spir.              | Independence, Missouri.   | Smithsonian Inst.                                        |
| <i>g.</i> Yg., spir.               | Typee Springs, Tennessee. | Smithsonian Inst.                                        |
| <i>h, i.</i> Hgr., stfñd.          | Louisiana.                |                                                          |
| <i>k.</i> Yg., skel.               | New Orleans.              | M. Sallé [C.]                                            |
| <i>l.</i> Yg., spir.               | N. America.               | Lord A. Russell<br>[P.]                                  |
| <i>m.</i> Hgr., stfñd.             | N. America.               | Gen. Hardwicke<br>[P.]                                   |
| <i>n, o, p.</i> Ad. & hgr., stfñd. | N. America.               |                                                          |
| <i>q, r.</i> Hgr. & yg., spir.     | N. America.               |                                                          |
| <i>s, t.</i> Hgr., skel.           | N. America.               |                                                          |
| <i>u.</i> Skull.                   | N. America.               |                                                          |

## 2. *Chelydra rossignonii*.

*Emysaurus rossignonii*, *Bocourt, Miss. Sc. Mex., Rept.* p. 18, pl. v. fig. 2 (1870).

*Chelydra rossignonii*, *Cope, Proc. Ac. Philad.* 1872, p. 23; *Günth. Biol. C.-Am., Rept.* p. 10 (1885).

This species, which is known only from young specimens, appears to be intermediate between *C. serpentina* and the fossil *C. murchisonii*. From the former, it differs in the much broader bridge, which measures hardly one seventh of the length of the plastron ; abdominal scutes not twice as broad as deep. Chin with four barbels.

Mexico ; Guatemala.

## 2. MACROCLEMMYS.

*Chelonura*, part., *Holbrook, N. Am. Herp.* i. p. 139 (1842).

*Macrolemys*, *Gray, Cat. Sh. Rept.* i. p. 48 (1855).

*Macrochelys*, *Gray, Proc. Zool. Soc.* 1855, p. 200 (1856), and *Suppl. Cat. Sh. Rept.* i. p. 64 (1870).

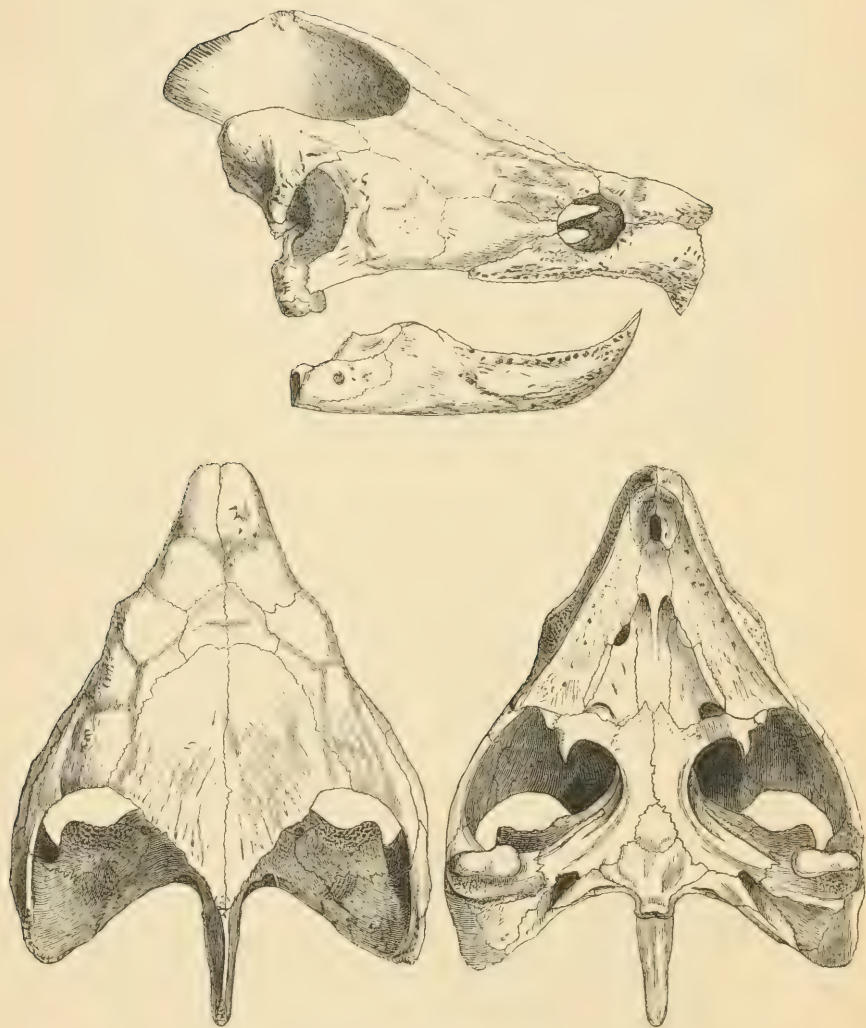
*Gypochelys*, *Agassiz, Contr. N. H. U. S.* i. p. 413 (1857).

*Macrolemmys*, *Strauch, Chelon. Stud.* p. 35 (1862).

Three or four additional or supramarginal shields on each side. Orbits lateral. Tail with small scales inferiorly.

North America.

Fig. 5.

Skull of *Macrolemmys temminckii*.

1. *Macroclommys temminckii*.

*Chelonura temminckii* (Troost), *Holbr. l. c.* p. 147, pl. xxiv.

*Emysaurus temminckii*, *A. Dum. Cat. Méth. Rept.* p. 16 (1851).

*Macroclommys temminckii*, *Gray, Cat. Sh. Rept.* i. p. 49, pls. xxxviii. fig. 2, xxxix., & xl. fig. 1.

*Macrochelys temminckii*, *Gray, Proc. Zool. Soc.* 1855, p. 200, and *Suppl. Cat. Sh. Rept.* i. p. 64.

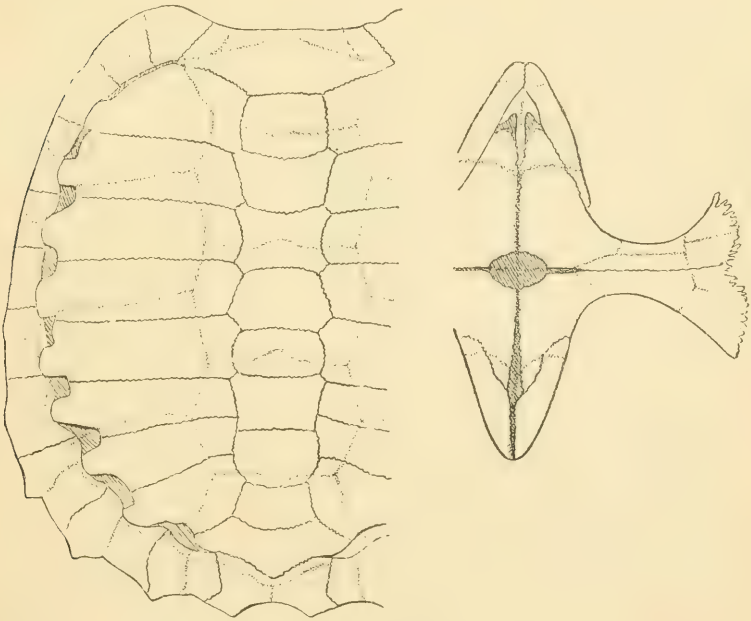
*Gypochelys lacertina*, *Agassiz, l. c.* p. 414, pl. v. figs. 23-27.

*Macroclommys temminckii*, *Strauch, l. c.* p. 134.

*Macrochelys lacertina*, *Cope, Proc. Ac. Philad.* 1872, p. 23.

Carapace strongly tricarinate. Vertebral shields much broader than long, at least three fourths the width of the costals. Width

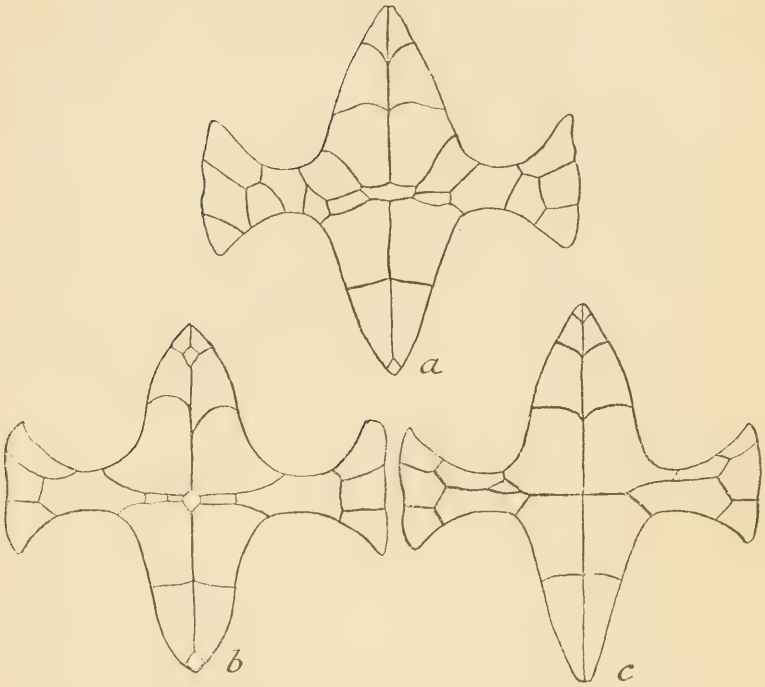
Fig. 6.

Shell of *Macroclommys temminckii*.

of the bridge one seventh to one ninth of the length of the plastron; the hypoplastra take a rather greater share in the formation of the bridge than the hyoplastra. Plastral shields subject to great variation; the arrangement in the three specimens in the Museum is shown by the following figures (fig. 7). Fig. *b* affords good support to the view that the shield covering the bridge is the displaced abdominal; it also offers the striking example of an intergular, placed as in *Chelodina*; fig. *c* shows a pair of intergulars, as in the fossil genus *Baëna*.



Fig. 7.

Plastra of *Macrolemmys temminckii*.

Head extremely large; eyes lateral and widely separated. Neck and chin with small dermal flaps. Tail two thirds or three fourths the length of the carapace in the adult, with three series of feebly elevated large tubercles above.

The largest specimen measures:—Head and neck 36 centim., carapace 58, tail 45.

North America, from Western Texas to Florida, northwards to Missouri.

*a, b.* Ad., stfdd.

*c, d.* Ad., skel.

*e.* Ad., stfdd.

*f.* Hgr., skull & shell.

Mississippi.

Mississippi.

Louisiana.

N. America.

John Dillon, Esq. [P.]

W. P. Smith [C.]

Smithsonian Inst.

## Fam. 3. DERMATEMYDIDÆ.

Steganopodes, part., *Wagler, Syst. Amph.* 1830.

Elodites Cryptodères, part., *Duméril & Bibron, Erp. Gén.* ii. 1835.

Emydidæ, part., *Gray, Cat. Tort.* 1844, and *Sh. Rept.* i. 1855.

Chersemyda, part., *Strauch, Chelon. Stud.* 1862.

Dermatemydæ, Chelydridæ, part., *Gray, Suppl. Cat. Sh. Rept.* i. 1870.

Chelydrinæ, part., *Cope, Proc. Ac. Philad.* 1872, p. 22.

Chelydridæ, part., Emydidæ, part., *Cope, Proc. Amer. Philos. Soc.* xx. 1882, p. 144.

Staurotypidæ, *Günther & Boulenger, "Tortoises," Encycl. Brit.* 1888.

Dermatemydidæ, *Baur, Zool. Anz.* 1888, p. 595.

Nuchal plate produced into costiform processes, underlying the marginals. Plastral bones nine. Shell covered with epidermal shields. Caudal vertebræ procœlous. Neck completely retractile within the shell. Temporal region not roofed over; no parieto-squamosal arch. Digits moderately elongate; phalanges with condyles; claws four or five.

This family is intermediate between the Chelydridæ and the Cinosternidæ, agreeing with the former in the presence of the entoplastral bone, and the absence of a symphysial bridge between the pubis and ischium, with the latter in the procœlous caudal vertebræ. In the mode of articulation of the posterior cervical vertebræ, and in the development of rib-like transverse processes to the nuchal, the three families agree. The Dermatemydidæ and Cinosternidæ further agree in the neural plates forming an incomplete series, the posterior costals meeting on the median line.

Externally, the separation of the plastral shields from the marginals by the interposition of a series of inframarginals distinguishes this family from the Testudinidæ, and the short tail readily from the Chelydridæ and Platysternidæ.

In *Dermatemys*, the second cervical vertebra is biconvex and all the following are procœlous; in *Staurotypus*, as in *Cinosternum*, the second is opisthocœlous, the third biconvex, and the rest procœlous.

The habitat of the Dermatemydidæ is restricted to Central America.

*Synopsis of the Genera.*

- I. Plastron large, connected with the carapace by a broad bridge; plastral shields eleven or more; chin without dermal appendages . . . . . 1. *Dermatemys*, p. 27.
  - II. Plastron small, cruciform, with from seven to nine shields; chin with a pair of dermal appendages.
- Plastron joined to carapace by suture . . . 2. *Staurotypus*, p. 29.
- Plastron joined to carapace by ligament . . 3. *Claudius*, p. 32.

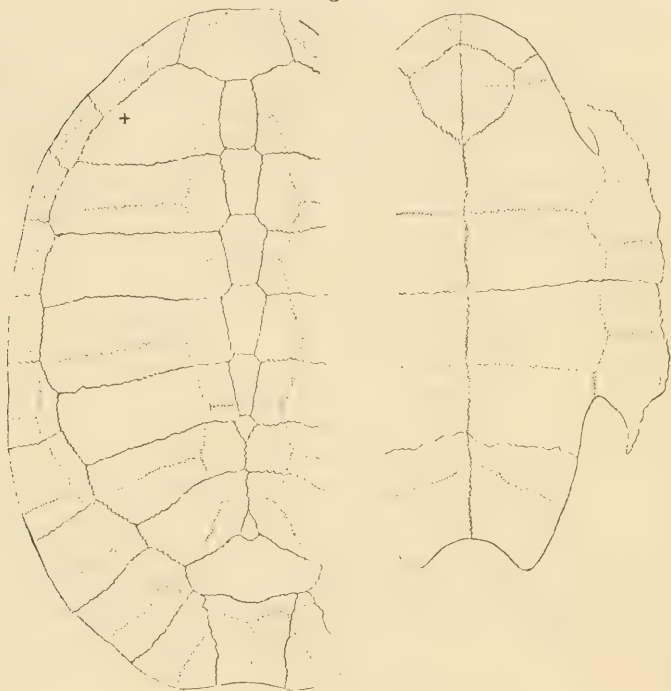
## 1. DERMATEMYS.

*Dermatemys*, *Gray, Proc. Zool. Soc.* 1847, p. 55, and *Cat. Sh. Rept.* i. p. 49 (1855), and *Suppl.* p. 49 (1870); *Bocourt, Miss. Sc. Mex., Rept.* p. 17 (1870).

*Chloremys*, *Gray, Proc. Zool. Soc.* 1870, p. 715, and *Suppl. Cat. Sh. Rept.* p. 50.

Carapace much depressed; marginal shields, one azygos nuchal and 12 pairs. Plastron large, extensively united to the carapace by suture, with short axillary and inguinal buttresses, the former just reaching the first costal plate, the latter terminating on the eighth marginal. Six pairs of plastral shields, the anterior (gular) usually fused; a series of inframarginals separates the marginal from the plastral shields. Skull with a bony temporal arch;

Fig. 8.

Shell of *Dermatemys mawii* \*.

alveolar surfaces very broad, of upper jaw with a strong denticulated median ridge and a short perpendicular one in front; lower jaw with two cutting-edges on each side, which are connected anteriorly by a short perpendicular ridge; edge of jaws toothed. Digits very broadly webbed. Tail very short.

Central America.

### 1. *Dermatemys mawii*.

*Dermatemys mawii*, Gray, *Proc. Zool. Soc.* 1847, and *Cat. Sh. Rept.* i. p. 49, pl. xxi. (1855); Cope, *Proc. Ac. Philad.* 1868, p. 120; *P. de*

\* In this and in the following figures the crosses on the carapace indicate the position of the extremity of the axillary and inguinal peduncles of the plastron, which anchylose with the lower surface of the carapace.

- Borre, Bull. Ac. Belg.* (2) xxviii. p. 116 (1869); *Gray, Suppl.* p. 50 (1870); *Bocourt, l. c.* p. 17, pl. vii. fig. 2; *Rütimeyer, N. Denkschr. Schweiz. Ges. Naturw.* xxv. p. 152 (1873); *Günth. Biol. C.-Am., Rept.* p. 10 (1885).  
*Emys berardii, A. Dum. Cat. Méth. Rept.* p. 11 (1851), and *Arch. Mus.* vi. p. 231, pl. xv. (1852).  
*Dermatemys abnormis, Cope, l. c.*  
 — *berardii, Cope, l. c.; Gray, Suppl.* p. 50.  
 — *salvini, Gray, Proc. Zool. Soc.* 1870, p. 517, and *Suppl.* p. 50.  
*Chloremys abnormis, Gray, Proc. Zool. Soc.* 1870, p. 716, pl. xlii., and *Suppl.* p. 50.

Carapace of adult vermiculated, keelless, or with a very obtuse keel posteriorly; of young keeled throughout; posterior margin expanded, not serrated; vertebral shields much broader than long and broader than the costals in the very young, longer than broad and much narrower than the costals in the adult; anterior border of second to fourth vertebrals straight transverse in the young, convex or obtusely angular in the adult. Plastron with the lobes rather narrow and much shorter than the bridge; front lobe rounded, hind lobe angularly notched; gular shield often single or semi-divided, longer than broad, sometimes with a small azygos shield behind it; four or five inframarginal shields, first (axillary) smallest, last (inguinal) largest. Head moderate; snout pointed, very prominent, turned upwards. Digits webbed beyond the base of the claws, the web forming a much developed fringe on the outer edge of the hand and foot; limbs with widely separated narrow transverse lamellæ. Tail extremely short, with two rows of conical tubercles above and one on each side. Olive above, yellowish inferiorly; sides of head speckled with blackish.

Length of shell 38 centim.

Tabasco, Yucatan, Guatemala, Belize, Honduras.

|                |            |                                                       |
|----------------|------------|-------------------------------------------------------|
| a. ♀, spir.    | Guatemala. | O. Salvin, Esq. [P.]<br>(Type of <i>D. salvini</i> .) |
| b. Ad., shell. | Honduras.  | Science & Art Depart. [P.]                            |
| c. Ad., shell. | —?         | Lieut. Maw [P.] (Type.)                               |
| d. Yg., skel.  | —?         |                                                       |

## 2. STAUROTYPUS.

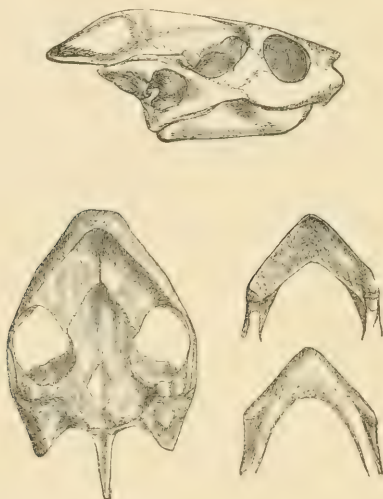
- Staurotypus, Wagl. Syst. Amph.* p. 137 (1830); *Gray, Cat. Sh. Rept.* i. p. 47 (1855); *Strauch, Chelon. Stud.* p. 37 (1862); *Gray, Suppl. Cat. Sh. Rept.* i. p. 65 (1870); *Bocourt, Miss. Sc. Mex., Rept.* p. 21 (1870).  
*Staurotypus, part., Dum. & Bibr.* ii. p. 354 (1835).  
*Kinosternon, part., Gray, Cat. Tort.* p. 34 (1844).  
*Stauremys, Gray, Proc. Zool. Soc.* 1864, p. 127, and *Suppl. Cat. Sh. Rept.* i. p. 65.  
*Claudius, part., Cope, Proc. Ac. Philad.* 1872, p. 23.

Carapace much depressed, tricarinate; marginal shields, one azygos nuchal and 11 pairs. Plastron narrow, cruciform, angular posteriorly, articulating with the marginals by suture, anterior

lobe movable; with four pairs of shields, of which the posterior or anal are usually coalesced into a single shield; a very small gular may be present; abdominals separated from the marginals by two shields. Beak scarcely hooked; jaws with a single sharp edge; orbits directed upwards; postorbital and temporal arches moderate. Chin with a pair of barbels. Digits webbed. Tail short.

Central America.

Fig. 9.



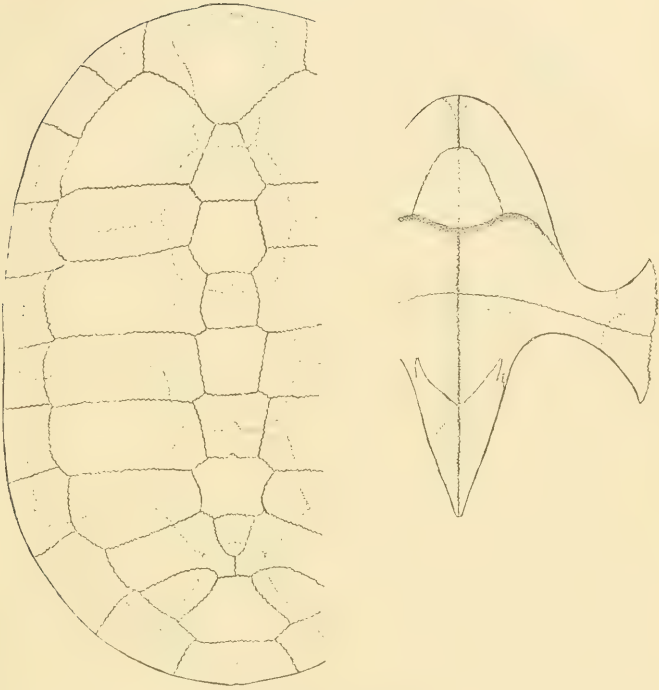
Skull of *Staurotypus salvinii*. (From Gray, P. Z. S. 1869.)

The two species agree in the following characters:—Vertebral shields not broader than long, not two thirds the width of the costals; an emargination in the posterior border of each of the vertebral and costal shields, corresponding to the three keels which run along the carapace. Head extremely large; a large horny shield covers the upper jaw, another the mandible, and a third the upper surface of the snout; soft parts with small warts; tympanum indistinct under the thick skin. Wrist and heel with curved band-like lamellæ. Male with a patch of small horny, sharp-edged tubercles on the lower surface of the leg and another under the thigh. Tail with more or less distinct small conical tubercles, forming paired longitudinal series.

In *S. salvinii* the neural plates are seven in number, about as broad as long; the last is separated from the pygal by the seventh pair of costals; the eighth pair of costals is separated by the pygal, which is either single or divided into a small anterior and a large posterior plate. The hyoplastral bones have a greater share in the formation of the bridge than the hypoplastrals.



Fig. 10.

Shell of *Staurotypus salvinii*.

### 1. *Staurotypus triporcatus*.

*Terrapene triporcata*, *Wiegman, Isis*, 1828, p. 364.

*Staurotypus triporcatus*, *Wagler, Syst. Amph.* pl. v. figs. 44, 45 (1830),  
and *Icon. Amph.* pl. xxxiii. (1833); *Duméril & Bibron, ii.* p. 536 (1835);  
*Gray, Cat. Sh. Rept.* i. p. 47, pl. xx b. (1855); *Bocourt, Miss. Sc.*  
*Mex., Rept.* p. 21 (1870).

*Kinosternon triporcatum*, *Gray, Cat. Tort.* p. 34 (1844).

Anterior lobe of plastron broad, with the longitudinal borders straight or slightly concave; bridge comparatively broad, its diameter about four times and a half in the length of the plastron. No gular shield; the suture between the pectorals is the longest; the suture between the latter shields and the abdominals strongly sinuous; the greatest length of the abdominal shields equals their width; inframarginals longer than broad.

Length of carapace 34 centim.

Mexico, Guatemala.

a. ♂, stfid.

Vera Cruz,

M. Sallé [C.].

2. *Staurotypus salvinii*.

- Staurotypus* (*Stauremys*) *salvinii*, *Gray, Proc. Zool. Soc.* 1864, p. 127.  
*Stauremys salvinii*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 65 (1870); *Cope, Proc. Ac. Philad.* 1872, p. 28.  
*Staurotypus salvinii*, *Bocourt, Miss. Sc. Mex., Rept.* p. 22, pl. v. fig. 3 (1870); *Günth. Biol. C.-Am., Rept.* p. 11 (1885).  
 — *marmoratus*, *J. v. Fischer, Arch. f. Nat.* 1872, p. 265, pl. x.  
*Claudius severus*, *Cope, l. c.* p. 24; *Sumichrast, Bull. Soc. Zool. France*, 1880, p. 167.  
 — *pictus*, *Cope, l. c.* p. 26.  
*Staurotypus* (*Claudius*) *severus*, *Bocourt, Journ. Zool.* v. p. 387 (1876).

Anterior lobe of plastron semielliptic or angular; bridge narrow, its diameter more than five times in the length of the plastron ( $5\frac{1}{2}$  to 7 times in females,  $7\frac{1}{2}$  to 10 times in males). A small gular shield is present or absent; suture between the humerals the longest; abdominals much broader than long; inframarginal shields usually not longer than broad.

Length of carapace 18 centim.

Mexico, Guatemala.

|                        |                       |                                                      |
|------------------------|-----------------------|------------------------------------------------------|
| a. ♀, spir.            | Huamuchal, Guatemala. | O. Salvin, Esq. [C.].<br>(Type.)                     |
| b. Hgr., skel.         | Guatemala.            |                                                      |
| c, d, e. ♂ ♀, spir.    | Tapana, Tehuantepec.  | F. Sumichrast [C.].<br>Messrs. Salvin & Godman [P.]. |
| f. ♂, stf'd.           | Tapana.               | F. Sumichrast [C.].                                  |
| g. ♂, shell and skull. | Tapana.               | F. Sumichrast [C.].                                  |
| h, i, k. ♂ ♀, shells.  | Tapana.               | F. Sumichrast [C.].                                  |
| l. Yg., spir.          | Mexico.               |                                                      |

3. *CLAUDIUS*.

- Claudius*, *Cope, Proc. Ac. Philad.* 1865, p. 187; *Bocourt, Miss. Sc. Mex., Rept.* p. 19 (1870); *Cope, Bull. U.S. Nat. Mus.* no. 32, p. 23 (1887).  
*Claudius*, part., *Cope, Proc. Ac. Philad.* 1872, p. 23.

Differs from the preceding genus by the very slender bridge, which does not expand towards the marginals, to which it is joined by ligament\*; anterior lobe of plastron not movable.

"Vertebral neural segments eight, the last pair of costals meeting on the median line, but separated from the small posterior marginal by a large penultimate shield" (*Cope*).

Mexico.

\* This indicates a shape of both the hyo- and hypoplastral bones similar to that of the hypoplastral in *Chelydra serpentina*.

1. *Claudius angustatus*.

*Claudius angustatus*, *Cope, Proc. Ac. Philad.* 1865, p. 187, and *Proc. Am. Philos. Soc.* xi. 1869, pl. ix.; *Bocourt, l. c.* p. 20, pl. iv.; *Cope, Proc. Ac. Philad.* 1872, p. 28; *Günth. Biol. C.-Am., Rept.* p. 12 (1885).

— *megacephalus*, *Bocourt, Ann. Sc. Nat.* (5) x. p. 122 (1868); *Cope, Proc. Ac. Philad.* 1872, p. 27.

Plastron rhomboidal, anterior and posterior lobes angular; a very small gular may be present; abdominals twice as broad as long; anals distinct or united. No warts on the neck.

Length of carapace 105 millim.

Mexico.

## Fam. 4. CINOSTERNIDÆ.

*Emydidæ*, part., *Gray, Ann. Phil.* (2) x. 1825.

*Steganopodes*, part., *Wagler, Syst. Amph.* 1830.

*Emydæ*, part., *Gray, Syn. Rept.* 1831.

*Flodites Cryptodères*, part., *Duméril & Bibron, Erp. Gén.* ii. 1835.

*Emydidæ*, part., *Gray, Cat. Tort.* 1844, and *Sh. Rept.* i. 1855.

*Cinosternidæ*, *Agassiz, Contr. N. H. U. S.* i. 1857.

*Chersemida*, part., *Strauch, Chelon. Stud.* 1862.

*Chelydradæ*, part., *Gray, Suppl. Cat. Sh. Rept.* i. 1870.

*Cinosternidæ*, *Cope, Proc. Am. Philos. Soc.* xx. 1882, p. 144.

Nuchal plate produced into costiform processes, underlying the marginals. Plastral bones eight, the entoplastron being absent. Shell covered with epidermal shields. Caudal vertebræ procœlous. Neck completely retractile within the shell. Temporal region not roofed over; no parieto-squamosal arch. Digits moderately elongate; phalanges with condyles; claws four or five.

## 1. CINOSTERNUM.

*Terrapene*, part., *Merr. Tent.* p. 27 (1820).

*Kinosternon*, *Spix, Spec. Nov. Testud.* p. 17 (1824); *Gray, Cat. Tort.* p. 32 (1844), and *Cat. Sh. Rept.* i. p. 43 (1855).

*Kinosternon*, part., *Bell, Zool. Journ.* ii. p. 302 (1825).

*Sternotherus*, part., *Bell, l. c.* p. 305.

*Cinosternon*, *Wagler, Syst. Amph.* p. 137 (1830); *Dum. & Bibr.* ii. p. 361 (1835); *Strauch, Chelon. Stud.* p. 39 (1862); *Bocourt, Miss. Sc. Mex., Rept.* p. 23 (1870).

*Urotyx*, *Rafin. Atlant. Journ.* p. 64 (1832).

*Diclidæ*, part., *Rafin. l. c.*

*Monoclidæ*, *Rafin. l. c.*

*Staurotypus*, part., *Dum. & Bibr.* ii. p. 354.

*Swanka*, *Gray, Cat. Tort.* p. 32, and *Suppl. Cat. Sh. Rept.* i. p. 67 (1870).

*Kinosternum*, *Leconte, Proc. Ac. Philad.* 1854, p. 180.

*Aromochelys*, *Gray, Cat. Sh. Rept.* i. p. 46; *Strauch, l. c.* p. 38.

*Goniochelys*, *Agassiz, Contr. N. H. U. S.* i. p. 423 (1857).

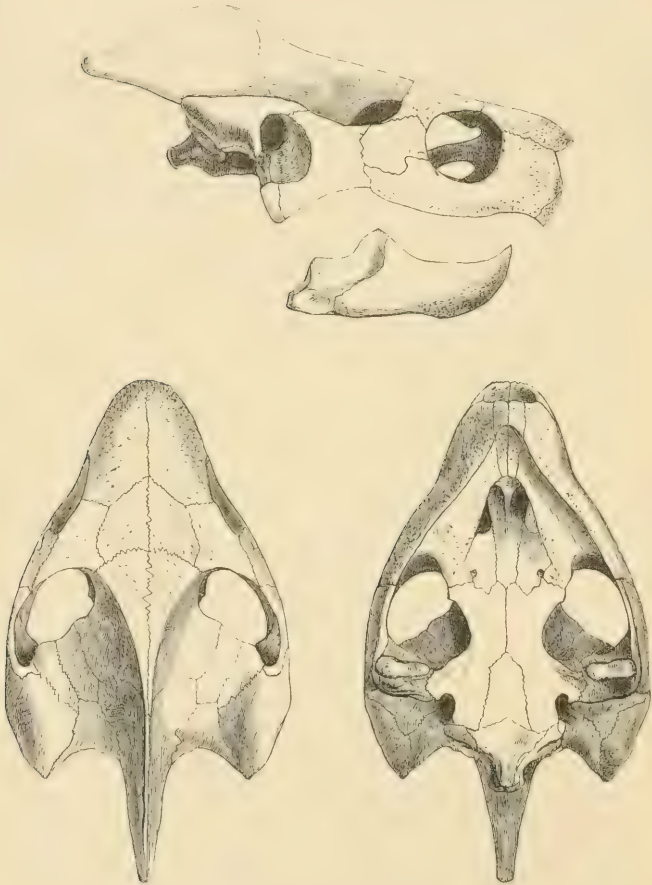
Ozotheca, *Agassiz, l. c. p. 424*; *Leconte, Proc. Ac. Philad. 1859, p. 5.*

Cinosternum, *Agassiz, l. c. p. 426*; *Leconte, l. c.*

Thyrosternum, *Agassiz, l. c. p. 427*; *Leconte, l. c.*

Platythyra, *Agassiz, l. c. p. 429.*

Fig. 11.



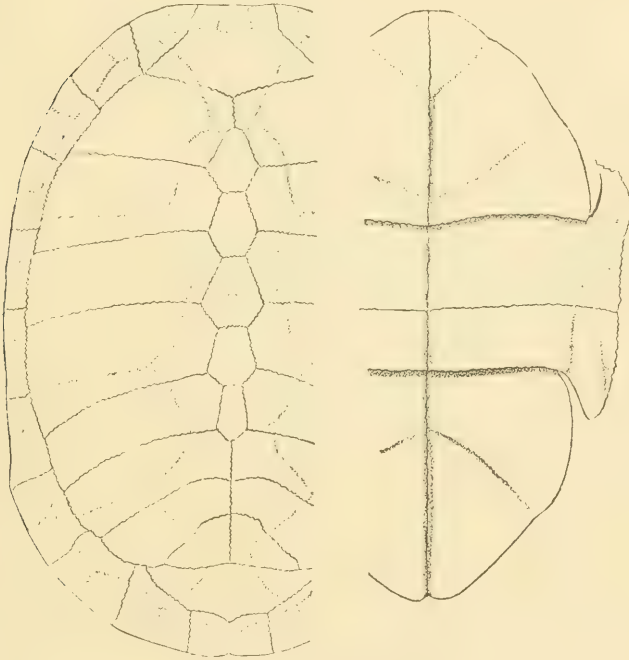
Skull of *Cinosternum leucostomum*.

Carapace more or less depressed; marginal shields, one azygos nuchal and 11 pairs. Plastron articulating with the marginals by suture, front and hind lobe movable; gular shield single or absent: pectoral shields not extending on the bridge. Postorbital and temporal arches moderate. Digits webbed; fingers all clawed, outer toe clawless. Tail short.

America, north of the Equator.

The rib-like process of the nuchal is long and situated behind the marginals in the young, short and extending below the first marginal in the adult. Neural plates narrow, forming an incomplete series, five or six in number, the two or three last pairs of costals, and sometimes also the first pair, in contact on the median line; eighth costal sometimes (*C. odoratum*, *C. scorpioides*) very small, and without distal point. Vertebral and costal shields usually imbricate. Limbs and tail scaleless; two or three curved lamellæ on the front of the forearm, and some on the hinder side of the leg.

Fig. 12.

Shell of *Cinosternum leucostomum*.

Young specimens of all the species are very similar, and their determination meets with great difficulties. There is but a small difference in the size of the plastron between a newly born *Cinosternum* of Group I. of the following synopsis and a corresponding one of Group II., whilst that between the latter and one of Group IV. is quite insignificant, if at all perceptible. The following synopsis of the species applies therefore only to adult specimens.

It must be borne in mind that, as in all Chelonians with hinged plastral lobes, the mobility does not exist in the quite young specimens, and is often scarcely distinct, or restricted to the front lobe only, in the halfgrown.



*Synopsis of the Species.*

- I. Plastron small, the width of the posterior lobe not more than half that of the shell; a narrow bridge connects the plastron with the carapace; lobes of plastron slightly, if at all, movable. Male with a patch of small horny, keeled tubercles on the hinder side of the leg and another below the thigh.

Gular shield well developed, triangular . . . . . 1. *odoratum*, p. 37.

Gular shield vestigial or absent . . . . . 2. *carinatum*, p. 38.

- II. Plastron of moderate size, smaller than the opening of the shell, connected with the carapace by a bridge, the width of which is considerably less than the length of the front plastral lobe; front and hind lobes movable; plastron notched posteriorly. Male with a patch of small horny, keeled tubercles on the hinder side of the leg and another below the thigh.

- A. Front plastral lobe considerably narrower than the opening of the shell.

Pectoral shields triangular, or forming a very short median suture . . . . . 4. *pensylvanicum*, p. 39.

Suture between the pectoral shields two thirds the length of that between the humerals; gular shield not one third the length of the front lobe of the plastron . . . . . 3. *hirtipes*, p. 38.

Suture between the pectoral shields nearly as long as that between the humerals; head and jaws without any spots . . . . . 5. *flavescens*, p. 40.

B. Front plastral lobe nearly closing up the shell . . . . . 6. *henrici*, p. 40.

- III. Plastron narrower than the opening of the shell, connected with the carapace by a very short bridge, the width of which nearly equals the length of the front plastral lobe; front and hind lobes movable; plastron notched posteriorly. Male without patches of horny tubercles on the hind limbs.

Carapace tricarinate . . . . . 7. *scorpioides*, p. 41.

- IV. Lobes of the plastron movable and completely closing the shell in the adult, the pectoral and femoral shields being then in contact with the axillary and inguinal; plastron not or but very feebly emarginate posteriorly. Male without patches of horny tubercles on the hind limbs.

A. Carapace unicarinate.

Plastron slightly nicked posteriorly . . . . . 8. *integrum*, p. 42.

- Plastron without trace of a notch, front lobe longer than the fixed portion; gular shield not more than half the length of the front lobe . . . . . 9. *leucostomum*, p. 42.
- Plastron without trace of a notch, front lobe not longer than the fixed portion; gular more than half the length of the front lobe . . . . . 10. *berendtianum*, p. 43.
- B. Carapace tricarinate . . . . . 11. *cruentatum*, p. 44.

1. *Cinosternum odoratum*.

- Testudo pensylvanica*, B., *Schoeffff*, *Test.* p. 110, pl. xxiv. fig. B (1792).
- *odorata* (*Bosc*), *Daud. Rept.* ii. p. 189, pl. xxiv. fig. 3 (1802); *Leconte, Ann. Lyc. N. Y.* iii. p. 122 (1830).
- ? *Testudo glutinata*, *Daud. l. c.* p. 194, fig. 4.
- Emys odorata*, *Schweigg. Prodr.* p. 44 (1814).
- Terrapene boscii*, *Merr. Tent.* p. 27 (1820).
- *odorata*, *Merr. l. c.*
- Cistuda odorata*, *Say, Journ. Ac. Philad.* iv. pp. 206, 216 (1824).
- Sternotherus odoratus*, *Bell, Zool. Journ.* ii. p. 307 (1825); *Holbr. N. Am. Herp.* i. p. 133, pl. xxii. (1842); *Wied, N. Acta Ac. Leop.-Carol.* xxxii. i. p. 43 (1865).
- *boscii*, *Bell, l. c.* p. 308.
- Kinosternum odoratum*, part., *Bonap. Osserv. sulla sec. ediz. del 'Regno Animale,'* p. 168 (1830).
- Kinosternon odoratum*, *Gray, Syn. Rept.* p. 35 (1831), and *Cat. Tort.* p. 43 (1844); *Leconte, Proc. Ac. Philad.* 1854, p. 185.
- Staurotypus odoratus*, *Dum. & Bibr.* ii. p. 358 (1835).
- Kinosternum guttatum*, *Leconte, l. c.*
- Aromochelys odorata*, *Gray, Cat. Sh. Rept.* i. p. 46 (1855); *Strauch, Chelon. Stud.* p. 140 (1862), and *Verth. Schildkr.* p. 94 (1865); *Gray, Suppl. Cat. Sh. Rept.* i. p. 66 (1870).
- Ozotheca odorata*, *Agass. Contr. N. H. U. S.* i. p. 425, pl. iv. figs. 1-6 (1857).
- *tristycha*, *Agass. l. c.* pl. v. figs. 20-22.
- Aromochelys guttata*, *Strauch, Chelon. Stud.* p. 39.
- *tristycha*, *Strauch, l. c.*

Head large; jaws very strong, upper not hooked; symphysis of the mandible about half as long as the whole mandible. Limbs extensively webbed. Carapace keeled in the young, the keel usually disappearing in the adult; first vertebral shield narrow, much narrower than the second, third and fourth not longer than broad. Plastron narrow, the width of the posterior lobe not more than half that of the shell; lobes slightly, if at all, movable; bridge narrow; front lobe rounded anteriorly, hind lobe notched posteriorly; gular shield well developed, triangular, about as long as the suture between the humerals, which nearly equals that between the pectorals; axillary and inguinal shields largely in contact. The

shields of the plastron are often, especially in full-grown specimens, much smaller than the area assigned to them, the interspaces showing the exposed underlying bones. Male with a patch of small, horny, keeled tubercles on the hinder side of the leg and another below the thigh. Tail without a nail-like horny appendage. Carapace yellowish or brown, uniform or spotted or streaked with dark brown; the shields margined with blackish; plastron yellow, uniform or with dark brown blotches sometimes nearly covering the shields. Neck and limbs marbled with brown; two parallel yellow lines on each side of the head, the upper passing above the lower below the eye; a yellow streak on each side of the mandible.

Length of shell 11 centim.

Eastern North America, from Canada to the Gulf of Mexico.

|                            |                         |                             |
|----------------------------|-------------------------|-----------------------------|
| <i>a-b.</i> ♀ & yg., spir. | Carlisle, Pennsylvania. | Smithsonian Inst.           |
| <i>c.</i> Yg., spir.       | Delaware.               | H. Doubleday, Esq.<br>[P.]. |
| <i>a.</i> ♀, stuffed.      | Louisiana.              |                             |
| <i>e.</i> ♂, spir.         | Texas.                  | Dr. A. Günther [P.].        |
| <i>f.</i> ♂, spir.         | N. America.             | Lord Ampthill [P.].         |
| <i>g-i, h.</i> ♂ ♀, spir.  | N. America.             |                             |
| <i>l.</i> ♂, skel.         | N. America.             |                             |
| <i>m.</i> Hgr., shell.     | N. America.             |                             |

## 2. *Cinosternum carinatum*.

*Aromochelys carinata*, Gray, *Cat. Sh. Rept.* i. p. 47, pl. xx. A (1855); *Strauch, Chelon. Stud.* p. 39 (1862), and *Verth. Schildkr.* p. 96 (1865); Gray, *Suppl. Cat. Sh. Rept.* i. p. 66 (1870); Yarrow, in *Wheeler's Explor. Surv. W. 100th Mer.* v. p. 582 (1875).

*Goniochelys triquetra*, Agass. *Contr. N. H. U. S.* i. p. 423, & ii. p. 642 (1857).

? *Goniochelys minor*, Agass. *l. c.* p. 424.

? *Aromochelys minor*, Strauch, *ll. cc.*

Head larger, jaws stronger than in the preceding. Carapace tectiform, with a strong keel throughout life; shields distinctly imbricate, vertebrals all longer than broad. Plastron truncate anteriorly; no distinct gular shield; humeral shields forming a shorter suture than the pectorals, femorals a longer one than the anals. Shell and soft parts pale olive or yellowish brown, spotted or streaked with blackish brown; shields of the carapace edged with black, the hinder black edge of the costals broad.

Length of shell 13 centim.

Georgia to Arizona.

*a, b, c, d.* ♂ ♀, stuffed. Louisiana. W. P. Smith [C.]. (Types.)

## 3. *Cinosternum hirtipes* \*.

*Cinosternon hirtipes*, Wagler, *Syst. Amph.* pl. v. figs. 29, 30 (1830), and *Icon.* pl. xxx. (1833); Dum. & Bibr. ii. p. 370 (1834); Bocourt, *Miss. Sc. Mex., Rept.* p. 25 (1870), and *Journ. de Zool.* v. p. 393 (1876).

\* Type examined.

Very closely allied to *C. pensylvanicum*. Size larger. The suture between the pectoral shields two thirds the length of that between the humerals, and nearly equalling the length of the gular. The plastron is even rather smaller than in *C. pensylvanicum*, and the front lobe is not broader than the hind one. *C. hirtipes* may be regarded as intermediate between *C. odoratum* and *C. pensylvanicum*, as observed by Leconte.

Length of shell 12 centim.

Mexico.

#### 4. *Cinosternum pensylvanicum*.

*Testudo pensylvanica*, *Gmel. S. N. i.* p. 1042 (1788); *Schoepff, Test.* p. 107, pl. xxiv. fig. A (1792); *Daud. Rept. ii.* p. 182, pl. xxiv. figs. 1, 2 (1802).

*Emys pensylvanica*, *Schweigg. Prodr.* p. 44 (1814).

*Terrapene pensylvanica*, *Merr. Tent.* p. 27 (1820).

*Cistuda pensylvanica*, *Say, Journ. Ac. Philad. iv.* p. 216 (1825).

*Kinosternon pensylvanicum*, *Bell, Zool. Journ. ii.* p. 304 (1825); *Dum. & Bibr. ii.* p. 367 (1835); *Holbr. N. Am. Herp. i.* p. 127 pl. xxi. (1842); *Gray, Cat. Tort.* p. 33 (1844); *Leconte, Proc. Ac. Philad.* 1854, p. 183; *Gray, Cat. Sh. Rept. i.* p. 45, pl. xx. c. fig. 1, 2 (1855); *Strauch, Chelon. Stud.* p. 144 (1862), and *Verth. Schildkr.* p. 98 (1865); *Bocourt, Journ. de Zool. ii.* p. 392 (1876).

— oblongum, *Gray, Cat. Tort.* p. 33.

— doubledayi, *Gray, l. c.*, and *Cat. Sh. Rept. i.* p. 45, pl. xx.

— punctatum, *Gray, Cat. Sh. Rept. i.* p. 45, pl. xx. c. figs. 5, 6, and *Suppl.* p. 67 (1870).

— hippocrepis, *Gray, Cat. Sh. Rept. i.* p. 46, pl. xx. c. figs. 3, 4, and *Suppl.* p. 67.

*Thyrosternum pensylvanicum*, *Agass. Contr. N. II. U. S. i.* p. 428, pl. iv. figs. 7-12, & pl. v. figs. 16, 17 (1857).

*Swanka fasciata*, *Gray, Suppl. Cat. Sh. Rept. i.* p. 68.

Head moderate; jaws strong; beak feebly hooked. Limbs moderately webbed. Carapace with three faint keels in the young, keelless or with a single faint keel in the adult. Plastron of moderate size, smaller than the opening of the shell, connected with the carapace by a bridge, the width of which is considerably less than the length of the front plastral lobe; front and hind lobes well movable in the adult; front lobe longer than the fixed portion, much narrower than the opening of the shell; hind lobe notched posteriorly; gular shield not half the length of the front plastral lobe; pectorals triangular, inner angles meeting on the median line, or forming a very short suture; axillary and inguinal shields largely in contact. Male with a patch of small, horny, keeled tubercles on the hinder side of the leg, and another below the thigh. Tail ending in a nail-like horny tubercle. Carapace brown or brownish; plastron yellow or brown; all the sutures between the shields of the shell dark brown or blackish. Head and neck brown above, with yellowish spots, often with two more or less distinct yellowish streaks on each side, proceeding from the orbit; jaws yellowish with brown dots or lines.

Length of shell 11 centim.

Eastern North America, from New York to the Gulf of Mexico.

|                                       |              |                                    |
|---------------------------------------|--------------|------------------------------------|
| <i>a.</i> ♀, spir.                    | Washington.  | Smithsonian Instit.                |
| <i>b-c.</i> Yg., spir.                | Florida.     | E. Doubleday, Esq. [P.].           |
| <i>d.</i> Yg., skel.                  | Florida.     | E. Doubleday, Esq. [P.].           |
| <i>e-h.</i> ♂, ♀, & hgr., spir.       | New Orleans. | E. Doubleday, Esq. [P.].           |
| <i>i-k.</i> Yg., spir.                | New Orleans. | (Types of <i>C. hippocrepis</i> .) |
| <i>l, m, n.</i> ♂ ♀, stfdd.           | Louisiana.   |                                    |
| <i>o, p.</i> ♂, stfdd.                | N. America.  | (Types of <i>C. oblongum</i> .)    |
| <i>q.</i> Hgr., shell.                | N. America.  | (Type of <i>C. doubledayi</i> .)   |
| <i>r.</i> Yg., spir., very bad state. | N. America.  | (Type of <i>C. punctatum</i> .)    |
| <i>s.</i> ♀, stfdd.                   | N. America.  | E. Doubleday, Esq. [P.].           |
| <i>t, u.</i> Yg., spir.               | N. America.  | Sir E. Belcher [P.].               |
| <i>v, w.</i> ♀ & hgr., shells.        | N. America.  |                                    |
| <i>x.</i> ♀, spir.                    | ——?          | (Type of <i>Swanka fasciata</i> .) |
| <i>y.</i> ♀, skel.                    | ——?          |                                    |
| <i>z</i> ♀. Hgr., stfdd.              | ——?          |                                    |

The latter specimen, referred with some doubt to this species, is specimen *c* of Gray's *C. hippocrepis*. As already noticed by Gray, it is anomalous in having the pectoral and abdominal shields united; it differs also from all *Cinosterna* in having only 21 shields round the margin of the disk, instead of 23. The carapace is much more depressed than in *C. hippocrepis*, of which it is, however, perhaps only an anomalous specimen.

*Cinosternum sonoriense*, Leconte, Proc. Ac. Philad. 1854, p. 184 (*Thyrosternum sonoriense*, Agassiz, Contr. i. p. 428, pl. v. figs. 8-11), appears to be very closely allied to the preceding species. The differential characters have not been clearly defined.—*Hab.* Arizona.

### 5. *Cinosternum flavescens* \*.

*Platythya flavescens*, Agassiz, Contr. N. H. U. S. i. p. 430, pl. v. figs. 12-15 (1857).

*Cinosternum flavescens*, Cope, Check-List N. Am. Rept. p. 52 (1875); *Cones*, in *Wheeler's Explor. Surv. W. 100th Mer.* v. pl. xvii. (1875).

Jaws weak, beak not hooked. Nose short. Suture between the pectorals nearly as long as that between the humerals (in the adult). Otherwise apparently like *C. pennsylvanicum*, but stouter. Yellowish green, shields edged with black; beak unspotted.

Length of shell 11 centim.

Arkansas, Western Texas, and Gila River.

### 6. *Cinosternum henrici*.

*Cinosternum henrici*, Leconte, Proc. Ac. Philad. 1859, p. 4; *Yarrow*, in *Wheeler's Rep. Explor. Surv. W. 100th Mer.* v. p. 583, pl. xvi. (1875).

*Swanka henrici*, Gray, Suppl. Cat. Sh. Rept. i. p. 69 (1870).

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\* This species has never been described, and rests on the generic description published by Agassiz, in which nothing but cranial characters are given, and on the two figures quoted, Agassiz's being that of a quite young specimen.



Differs from *C. pennsylvanicum* in having the front plastral lobe wider, nearly closing up the shell; the bridge is also rather wider. Gular shield half as long as the front lobe of the plastron; pectorals forming a short suture. The membrane between the fixed part and the hind lobe of the plastron so wide as to make the joint appear double. Carapace brownish yellow, plastron yellow; head and neck dusky, on the top slightly varied with paler, beneath and on the sides, including the jaws, thickly speckled with yellow.

Length of shell  $11\frac{1}{2}$  centim.

New Mexico and Arizona.

### 7. *Cinosternum scorpoides*.

*Testudo scorpoides*, Linn. *S. N.* i. p. 352 (1766).

— *tricarinata*, Schoepff, *Test.* p. 9, pl. ii. (1792).

— *retzii*, Daud. *Rept.* ii. p. 174 (1802).

*Emys retzii*, Schweigg. *Prodr.* p. 43 (1814).

— *scorpioidea*, Schweigg. *l. c.*

*Terrapene tricarinata*, Merrem, *Tent.* p. 23 (1820).

*Chersine scorpoides*, Merr. *l. c.* p. 33.

*Kinosternon longicaudatum*, Spix, *Test.* p. 17, pl. xii. (1824); *Bell, Zool. Journ.* ii. p. 304 (1825); *Leconte, Proc. Ac. Philad.* 1854, p. 181; *Strauch, Chelon. Stud.* p. 142 (1862).

— *brevicaudatum*, Spix, *l. c.* p. 18, pl. xiii.; *Bell, l. c.*

— *shawianum*, Bell, *l. c.* p. 302.

— *scorpoides*, Gray, *Syn. Rept.* p. 34 (1831); *Bell, Mon. Testud.* (1833); *Dum. & Bibr.* v. p. 363 (1835); *Leconte, l. c.*; *Strauch, l. c.* p. 140.

— *scorpoides*, part., Gray, *Cat. Tort.* p. 32 (1844), and *Sh. Rept.* i. p. 44 (1855).

*Swanka scorpoides*, part., Gray, *Suppl. Cat. Sh. Rept.* i. p. 67 (1870).

— *longicaudata*, Gray, *l. c.* p. 69.

Head moderate; jaws strong, beak hooked. Digits moderately webbed. Carapace tricarinate, shields more or less distinctly imbricate. Plastron large but not closing entirely the shell; bridge broad and very short; lobes well movable; front lobe as long as the immovable portion; hind lobe notched posteriorly; gular shield usually about half the length of the front plastral lobe; suture between the pectoral shields much shorter than that between the humerals; axillary and inguinal shields largely in contact. Tail ending in a nail-like horny tubercle. Carapace brown; plastron yellow or brown; head brown, with yellowish spots; jaws yellowish, usually with brown streaks or marblings.

Length of shell 13 centim.

Guianas and Northern Brazil.

*a.* ♀, stfid. Cayenne.

*b, c.* ♂ & yg., stfid. — ?

*d, e-f, g-h, i.* ♀, hgr., & — ?

yg., spir. — ?

*k, l, m, n, o.* ♂ ♀, shells. — ?

8. *Cinosternum integrum*.

*Kinosternum integrum*, *Leconte, Proc. Ac. Philad.* 1854, p. 183;  
*Bocourt, Journ. de Zool.* v. p. 393 (1876); *Günth. Biol. C.-Am.,*  
*Rept.* p. 26 (1885).

*Thyrosternum integrum*, *Agassiz, Contr. N. H. U. S.* i. p. 429  
 (1857).

*Swanka integra*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 69 (1870).

*Cinosternum rostellum*, *Bocourt, l. c.* p. 391.

— *hirtipes* (*non Wagl.*), *Günth. l. c.* p. 15, pls. xii.-xv.\*

— *pensylvanicum* (*non Gmel.*), *Duges, La Naturella* (2) i. p. —,  
 pl. xi. figs. 1-4 (1888).

Head rather large; jaws strong; beak feebly hooked. Digits extensively webbed. Carapace with a feeble keel in the male and young, keelless in the adult female. Plastron entirely closing the box, feebly nicked posteriorly, and without bridge in the adult; lobes well movable, anterior longer than the immovable portion; gular shield not half the length of the front plastral lobe; suture between the pectoral shields much shorter than that between the humerals; axillary and inguinal shields narrowly in contact, or narrowly separated. Tail of male ending in a nail-like horny tubercle. Carapace brown, with small blackish dots in the male, with radiating lines in the halfgrown specimen; the sutures between the shields blackish; plastron yellowish or brown; head dark brown above, spotted or marbled with yellowish; throat and jaws yellowish, spotted with dark brown.

Length of shell 16 centim.

Mexico.

|                                     |                      |                     |
|-------------------------------------|----------------------|---------------------|
| <i>a-b</i> , c. ♂, ♀, & hgr., spir. | Mazatlan.            | Mr. A. Forrer [C.]. |
| <i>d-e</i> . ♀ & yg., spir.         | Tres Marias Islands. | Mr. A. Forrer [C.]. |
| <i>f</i> . Yg., spir.               | Presidio.            | Mr. A. Forrer [C.]. |

9. *Cinosternum leucostomum*.

*Cinosternum leucostomum*, *A. Dum. Cat. Méth. Rept.* p. 17 (1851),  
*and Arch. Mus.* vi. p. 239, pl. xvii. (1855); *Gray, Cat. Sh.*  
*Rept.* i. p. 46 (1855); *Cope, Proc. Ac. Philad.* 1865, p. 189; *Bocourt, Miss. Sc. Mex., Rept.* p. 25 (1870); *Slater, Proc. Zool. Soc.*  
 1871, p. 745; *Bocourt, Journ. de Zool.* v. p. 394 (1876).

— *scorpioides*, part., *Gray, l. c.* p. 44.

*Swanka scorpioides*, part., *Gray, Suppl. Cat. Sh. Rept.* i. p. 67 (1870).

— *maculata*, part., *Gray, l. c.* p. 68.

— *leucostoma*, *Gray, l. c.* p. 69.

*Cinosternum leucostomum*, part., *Günth. Biol. C.-Am., Rept.* p. 17,  
 pl. xvii. (1885).

— *brevigulare*, *Günth. l. c.* p. 17, pl. xviii. f. A.

— *cobanum*, *Günth. l. c.* p. 18, pl. xviii. f. B.

— *brevigulare*, *Cope, Proc. Am. Philos. Soc.* xxii. p. 389 (1885).

— *postinguinale*, *Cope, Bull. U.S. Nat. Mus.* no. 32, p. 23 (1887).

\* It should be mentioned that Dr. Günther, who obtained the type of Wagler's *C. hirtipes* from the Munich Museum on loan, still adheres to his opinion that the specimens from Mazatlan and Tres Marias Islands should be referred to that species rather than to *C. integrum*.

Jaws strong; beak feebly hooked. Carapace unicarinate, the keel disappearing in old specimens; marginals often much swollen. Plastron completely closing the box, not emarginate posteriorly; lobes well movable in the adult, front one longer than the fixed portion; gular shield not more than half the length of the front plastral lobe, usually less; suture between the pectoral shields much shorter than that between the brachials; axillary and inguinal shields separated or narrowly in contact. Tail ending in a claw-like horny scute. Carapace brown, plastron yellowish or brownish, sutures dark brown or black; head dark brown above and on the sides; snout and two longitudinal temporal bands spotted or vermiculated with yellowish; jaws uniform yellowish or horny brown in the female, with fine brown lines in the male.

Length of skull  $14\frac{1}{2}$  centim.

Central America; Colombia.

- |                       |                        |                                                           |
|-----------------------|------------------------|-----------------------------------------------------------|
| a. ♀, spir.           | Cosamaloapam, Mexico.  | M. Sallé [C.]. (Type of <i>Swanka maculata</i> .)         |
| b. ♂, skel.           | Cosamaloapam, Mexico.  | M. Sallé [C.].                                            |
| c. Hgr., spir.        | Playa Vicente, Mexico. | M. Sallé [C.]. (Type of <i>C. brevigulare</i> .)          |
| d. ♀, spir.           | Huamuchal, Guatemala.  | O. Salvin, Esq. [C.].                                     |
| e. Yg., spir.         | Coban, Vera Paz.       | O. Salvin, Esq. [C.]. (Types of <i>C. cobanum</i> .)      |
| f. Yg., spir.         | Cahabon, Vera Paz.     | F.C. Sarg, Esq. [C.].                                     |
| g-h. ♀, spir.         | Vera Paz.              | O. Salvin, Esq. [C.]. (Types of <i>Swanka maculata</i> .) |
| i. ♀, stfid.          | C. America.            |                                                           |
| k, l, m. ♂ ♀, shells. | —?                     |                                                           |
| n. ♂, skel.           | —?                     |                                                           |

### 10. *Cinosternum berendtianum*.

*Cinosternum berendtianum*, Cope, *Proc. Ac. Philad.* 1865, p. 189;

*Bocourt, Journ. de Zool.* v. p. 395 (1876).

*Swanka maculata*, part., Gray, *Suppl. Cat. Sh. Rept.* i. p. 68 (1870).

*Cinosternum effeldtii*, Peters, *Mon. Berl. Ac.* 1873, p. 603, pl. —;

*Bocourt, l. c.* p. 396; *Günth, Biol. C.-Am., Rept.* p. 16 (1885).

— *leucostomum*, part., *Günth, l. c.* p. 17, pl. xvi.

Snout longer than in *C. leucostomum*; beak strongly hooked in the male. Carapace unicarinate. Plastron completely closing the box, not emarginate posteriorly; lobes well movable, front one not longer than the fixed portion; gular shield more than half the length of the front plastral lobe; suture between the pectoral shields shorter than that between the humerals; axillary and inguinal shields separated or narrowly in contact. Tail ending in a claw-like horny scute. Carapace brown; plastron yellowish or brown, sutures dark brown; upper surface of head dotted with brown; jaws spotted or streaked with brown.

Length of shell  $10\frac{1}{2}$  centim.

Central America.

|                        |                       |                                                    |
|------------------------|-----------------------|----------------------------------------------------|
| <i>a-b.</i> ♂, spir.   | Cosamaloapam, Mexico. | M. Sallé [C.]. (Types of <i>Swanka maculata</i> .) |
| <i>c-d.</i> ♂ ♀, spir. | Guatemala.            | O. Salvin, Esq. [C.].                              |
| <i>e.</i> ♂, stfld.    | C. America.           |                                                    |

### 11. *Cinosternum cruentatum*.

*Cinosternum cruentatum*, *A. Dum. Cat. Méth. Rept.* p. 16 (1851), and *Arch. du Mus.* vi. p. 238, pl. xvi. (1855); *Gray, Cat. Sh. Rept.* i. p. 44 (1855); *Bocourt, Miss. Sc. Mex., Rept.* p. 23 (1870), and *Journ. de Zool.* v. p. 398 (1876); *Günth. Biol. C.-Am., Rept.* p. 13, pls. ix.-xi. (1885).

— *mexicanum*, *Leconte, Proc. Ac. Philad.* 1854, p. 182; *Rütimeyer, Verh. Naturf. Ges. Basel*, vi. p. 41 (1874).

— *scorpioides*, part., *Gray, l. c.* p. 44.

— *triliratum*, *Leconte, Proc. Ac. Philad.* 1859, p. 6; *Günth. l. c.* p. 14.

*Swanka scorpioides*, part., *Gray, Suppl. Cat. Sh. Rept.* i. p. 67 (1870).

— *mexicana*, *Gray, l. c.* p. 69.

— *cruentata*, *Gray, l. c.*

— *trilirata*, *Gray, l. c.*

*Cinosternum shawianum* (*non Bell*), *Bocourt, Journ. de Zool.* v. p. 397.

Head moderate; jaws strong; beak not or but very feebly hooked. Digits extensively webbed. Carapace tricarinate, the keels becoming very obtuse in old specimens. Plastron entirely closing the box and without bridge in the adult; lobes well movable, anterior usually longer than the immovable portion, posterior not nicked; gular shield about half the length of the front plastral lobe; pectoral shields triangular or forming a very short median suture; axillary and inguinal shields usually separated. Tail of male ending in a nail-like horny tubercle. Carapace brown; plastron yellow or brown, the sutures between the shields blackish. Sides of head and neck marbled with brown and yellowish (in spirit); jaws and throat yellowish, spotted or streaked with brown.

Length of shell 15 centim.

Central America.

|                         |                  |                                                     |
|-------------------------|------------------|-----------------------------------------------------|
| <i>a, b.</i> ♂ ♀, spir. | Tonala, Chiapas. | F. Sumichrast [C.]. Messrs. Salvin and Godman [P.]. |
| <i>c.</i> Hgr., shell.  | Tonala, Chiapas. | F. Sumichrast [C.]. Messrs. Salvin and Godman [P.]. |
| <i>d.</i> Yg., spir.    | Tonala, Chiapas. | F. Sumichrast [C.]. Messrs. Salvin and Godman [P.]. |
| <i>e-f.</i> Yg., spir.  | Oaxaca.          | Mr. Hoege [C.].                                     |
| <i>g, h.</i> ♀, stfld.  | Mexico.          |                                                     |
| <i>i.</i> ♀, shell.     | C. America.      | Rev. J. Allen [P.].                                 |
| <i>k.</i> ♀, spir.      | —?               | T. Bell, Esq. [P.].                                 |
| <i>l.</i> ♂, spir.      | —?               |                                                     |

*Cinosternum albogulare*, *Bocourt, Miss. Sc. Mex., Rept.* p. 23, and *Journ. de Zool.* v. p. 399, should perhaps be regarded merely as a variety of *C. cruentatum*, characterized by uniform yellowish-white jaws.—*Hab.* Costa Rica.

## Fam. 5. PLATYSTERNIDÆ.

Elodites Cryptodères, part., *Duméril & Bibron, Erp. Gén.* ii. 1835.

Emydidæ, part., *Gray, Cat. Tort.* 1844, and *Sh. Rept.* i. 1855.

Chersemyda, part., *Strauch, Chelon. Stud.* 1862.

Platysternidæ, *Gray, Suppl. Cat. Sh. Rept.* i. 1870.

Nuchal plate without costiform processes. Plastral bones nine. Shell covered with epidermal shields. Caudal vertebræ mostly opisthocœlous. Neck completely retractile within the shell. Temporal region completely roofed over; no parieto-squamosal arch. Digits moderately elongate; phalanges with condyles; claws four or five.

## 1. PLATYSTERNUM.

Platysternon, *Gray, Proc. Zool. Soc.* 1831, p. 106; *Dum. & Bibron* ii. p. 343 (1835); *Gray, Cat. Tort.* p. 35 (1844), and *Sh. Rept.* i. p. 49 (1855); *Strauch, Chelon. Stud.* p. 34 (1862); *Günth, Rept. Brit. Ind.* p. 42 (1864); *Gray, Suppl. Cat. Sh. Rept.* i. p. 69 (1870).

Plastron moderately large, connected with the carapace by ligament; a series of inframarginal shields separates the plastral shields from the marginals. Head very large, covered above with an undivided horny shield; jaws very strong, hooked, without additional alveolar ridges. Digits feebly webbed, all except the outer toe clawed. Tail very long, subcylindrical, compressed at the end, with rings of squarish shields.

S. China, Siam, Burma.

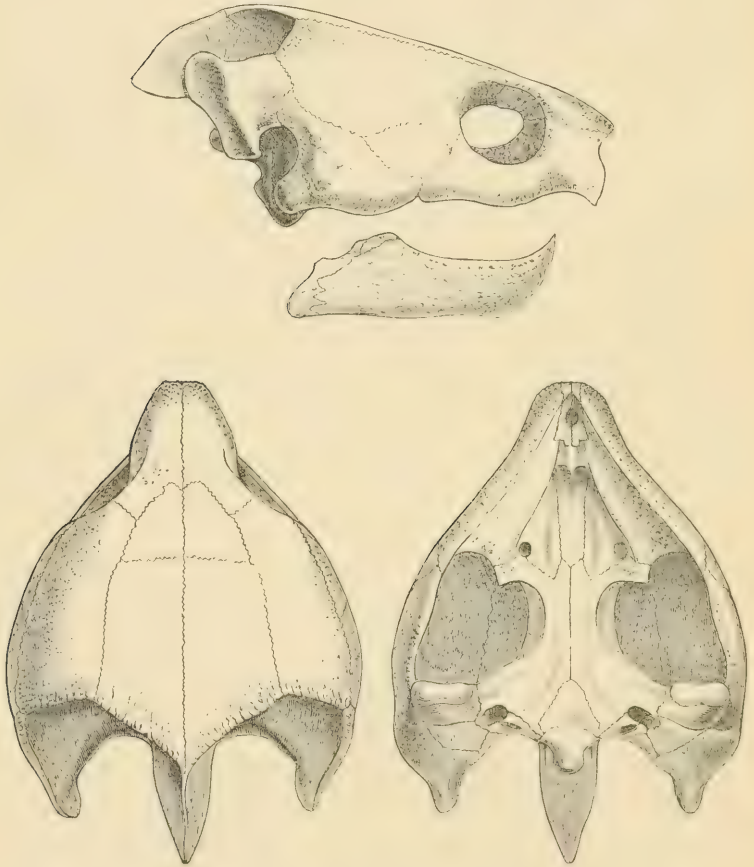
The affinities of the freshwater Tortoise which is the only known representative of this family are to a nearly equal degree with the Testudinidæ and with the Chelydridæ. The similarity of the skulls of *Platysternum* and *Macrocllemys* is very striking; but in the former the temporal roof is still more developed without, however, attaining the stage of the marine Turtles, in which the parietal bones join the squamosals; and the jugal presents this peculiarity, unique among Chelonians, that it is completely enclosed between three bones, viz. the postfrontal, the maxillary, and the quadrato-jugal. The cervical vertebræ are as in a typical Emydoid; second and third opisthocœlous, fourth and eighth amphicyrtous, fifth and sixth procœlous, seventh amphiœlous; there are three ginglymoid articulations (v., vi., vii.). The symphysial branches of the pubis and ischium are parallel, but connected only by ligament. The three anterior caudal vertebræ are procœlous, the next amphiœlous, then follow a series of nineteen opisthocœlous; the last ten are again procœlous. The neural plates form a complete series; they are, with the exception of the first, broader than long and hexagonal. Two pygals are present, in addition to the azygos marginal. The plastron is separated from the carapace by ligament, and



therefore develops no buttresses; the entoplastron ends in a short acute process.

1. *Platysternum megacephalum*.

Fig. 13.

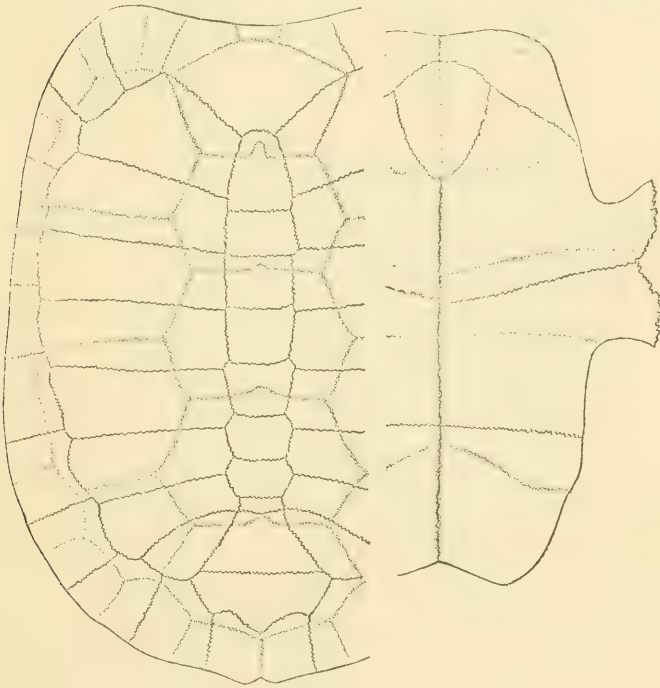


Skull of *Platysternum megacephalum*.

*Platysternon megacephalum*, Gray, *l. c.* p. 107, and *Ill. Ind. Zool.* i. pl. lxii. (1834); *Dum. & Bibr.* p. 344, pl. xvi. fig. 2; *Gray, Cat. Tort.* p. 35, and *Sh. Rept.* i. p. 49; *Günth. Rept. Brit. Ind.* p. 43 (1864); *Theob. Journ. Linn. Soc.* x. p. 17 (1868); *Bouleng. Ann. & Mag. N. H.* (5) xix. p. 461, pls. xvi. & xvii. (1887).  
*Emys megacephala*, Schleg. *Faun. Japon., Rept.* p. 49 (1838).  
*Platysternon peguense*, Gray, *Suppl. Cat. Sh. Rept.* i. p. 70 (1870).

Carapace much depressed, oval, with a feeble median keel posteriorly; anterior border broadly emarginate. Nuchal shield very small, broader than long; vertebrals broader than long, as broad as or a little narrower than the costals, much broader in the young, in which the posterior border of the carapace is distinctly serrated. Front lobe of plastron squarish, posterior angularly emarginate; the width of the bridge contained four or five times in the length of the plastron; the longest plastral shields are the anals, the femorals, and the humerals; the shortest, the gulars, which occupy, however,

Fig. 14.

Shell of *Platysternum megacephalum*.

the whole width of the front border of the plastron; frequently a small intergular shield between the gulars and the humerals. Upper surface of head and temple with an undivided horny scute. Throat with round flat tubercles. Anterior face of arm with large squarish scutes. Hinder side of thighs with large conical tubercles. Tail at least as long as the shell. Carapace and soft parts of adult olive-brown; plastron yellowish brown. Young more elegantly marked:—Upper surface of head and neck and carapace olive-brown, with a

few dark-brown dots on the crown and one in the centre of each costal scute; the edge of the carapace yellow; jaws yellow; a yellow black-edged streak on each side along the temple; sides and lower surface of neck and limbs whitish; upper surface of limbs blackish; plastron yellow, with a symmetrical black marking along the middle; tail blackish above, yellow, with a black median line, inferiorly.

Head and neck 85 millim., carapace 150, tail 170.

Southern China, Siam, Burma.

|                         |             |                                                         |
|-------------------------|-------------|---------------------------------------------------------|
| <i>a.</i> Hgr., stffid. | S. China.   | J. Reeves, Esq. [P.]. (Type.)                           |
| <i>b.</i> Hgr., skel.   | S. China.   | J. Reeves, Esq. [P.].                                   |
| <i>c.</i> Ad., stffid.  | China?      | Zoological Society.                                     |
| <i>d.</i> Ad., spir.    | Laos, Siam. |                                                         |
| <i>e-f.</i> Yg., spir.  | Pegu.       | W. Theobald, Esq. [C.]. (Types of <i>P. peguense</i> .) |
| <i>g.</i> Hgr., spir.   | Burma.      | W. T. Blanford, Esq. [P.].                              |

## Fam. 6. TESTUDINIDÆ.

Testudinidæ, Emydidæ, part., *Gray, Ann. Phil.* (2) x. 1825.

Testudinidæ, Emydidæ, part., *Bell, Zool. Journ.* iii. 1828.

Tyloposes, Steganopodes, part., *Wagler, Syst. Amph.* 1830.

Testudinidæ, Emydæ, part., *Gray, Syn. Rept.* 1831.

Chersites, Elodites Cryptodères, part., *Duméril & Bibron, Erp. Gén.* ii. 1835.

Testudinidæ, Emydidæ, part., *Gray, Cat. Tort.* 1844, and *Sh. Rept.* i. 1855.

Emydoidæ, Nectemydoidæ, Deirochelyoidæ, Emydoidæ, Clemmydoidæ, Cistudinina, Testudinina, *Agassiz, Contr. Nat. Hist. U. S.* 1857.

Chersemeydina, part., *Strauch, Chelon. Stud.* 1862.

Testudinidæ, Cistudinidæ, Emydidæ, Malaclemmydæ, Pseudemydæ, Bataguridæ, *Gray, Suppl. Cat. Sh. Rept.* i. 1870.

Testudinidæ, Emydidæ, part., Cistudinidæ, *Cope, Proc. Amer. Phil. Soc.* xx. 1882, p. 144.

Nuchal plate without well-developed costiform processes. Plastral bones nine. Shell covered with epidermal shields. Caudal vertebrae procœlous. Neck completely retractile within the shell. Lateral temporal arch usually present; no parieto-squamosal arch. Digits short or moderately elongate; phalanges with condyles; claws four or five.

Cosmopolitan, except Australia and Papuasias.

The genera included in this family form a pretty continuous series from such thoroughly aquatic forms as the Batagurs to the Land-Tortoises\*; and this series has been followed, in the following

---

\* A recent writer suggests to separate the Land-Tortoises from the Emyds on the ground of the presence in the former and the absence in the latter of dermal ossifications on the limbs. But the absence of such ossifications in the gigantic Land-Tortoises destroys the value of that character.

pages, so far as consistent with what appear to be the affinities of the various forms. But for the necessities of a serial arrangement, the genus *Emys*, in many respects the least specialized, might be placed at the base of the family, with two diverging series of genera culminating in the *Batagurs* on the one hand and in the Land-Tortoises on the other.

*Synopsis of the Genera.*

I. Digits usually webbed, or with at least a slight rudiment of web, the median with three phalanges; metacarpals elongate.

A. Hexagonal neural plates short-sided in front.

1. Alveolar surface of upper jaw broad, with one or two median ridges.

*a.* Axillary and inguinal buttresses much developed, the former connected with or nearly reaching the first rib, the latter ankylosed between two costal plates (5th and 6th); entoplastron anterior to the humero-pectoral suture.

*α.* Fourth vertebral shield elongate, embracing four or five neural bones . . 1. **Kachuga**, p. 51.

*β.* Fourth vertebral shield not longer than third, embracing three neural bones.

Choanæ between the eyes; alveolar surface of upper jaw with a single median ridge . . . . . 2. **Callagur**, p. 60.

Choanæ behind the level of the eyes; alveolar surface of upper jaw with two median ridges; fore limb with four claws only.  
3. **Batagur**, p. 61.

Choanæ behind the level of the eyes; alveolar surface of upper jaw with a single median ridge . . . . 4. **Hardella**, p. 63.

*b.* Axillary and inguinal buttresses short or moderate.

Choanæ behind the level of the eyes; inguinal buttress ankylosed to the fifth (exceptionally sixth) costal plate; entoplastron anterior to the humero-pectoral suture.

5. **Morenia**, p. 66.

Choanæ between the eyes; inguinal buttress ankylosed to the fifth costal plate; entoplastron anterior to the humero-pectoral suture.  
6. **Chrysemys**, p. 69.

Choanæ between the eyes; inguinal buttress ankylosed between the fifth and sixth costal plates; entoplastron intersected by the humero-pectoral suture. . . . . 7. **Ocadia**, p. 85.

## 2. Alveolar surface of upper jaw without median ridge.

*a.* Choanæ behind the level of the eyes; alveolar surface of jaws very broad.

Inguinal buttress anchylosed to the fifth costal plate; upper surface of head covered with undivided skin; entoplastron anterior to the humero-pectoral suture. . . . . 8. *Malacoclemmys*, p. 88.

Inguinal buttress anchylosed between the fifth and sixth (exceptionally fourth and fifth) costal plates; hinder part of head covered with small shields; entoplastron intersected by the humero-pectoral suture. . . . . 9. *Damonia*, p. 92.

*b.* Choanæ between the eyes; entoplastron intersected by the humero-pectoral suture.

*α.* Plastron not hinged.

Axillary and inguinal buttresses strong, latter anchylosed between the fifth and sixth costal plates; hinder part of head covered with small shields . . . . . 10. *Bellia*, p. 97.

Axillary and inguinal buttresses short, latter just reaching the fifth costal plate; upper surface of head with undivided skin.

11. *Clemmys*, p. 100.

*β.* Plastron hinged, movable.

A bony temporal arch; beak not hooked.

12. *Emys*, p. 111.

No bony temporal arch; beak hooked.

13. *Cistudo*, p. 114.

B. Hexagonal neural plates (at least the anterior) short-sided behind; entoplastron intersected by the humero-pectoral suture.

Plastron not hinged; a bony temporal arch.

14. *Nicoria*, p. 118.

Plastron hinged, movable; a bony temporal arch.

15. *Cyclemys*, p. 128.

Plastron not hinged; no bony temporal arch.

16. *Geoemyda*, p. 135.

II. Digits without a rudiment of web, with not more than two phalanges; metacarpals not or but slightly longer than broad; neural plates mostly hexagonal, short-sided behind, or alternately tetragonal and octagonal.

A. Alveolar surface of upper jaw without a median ridge.

Posterior portion of carapace hinged, movable.

17. *Cinixys*, p. 140.



Carapace without hinge; front lobe of plastron movable.

18. *Pyxis*, p. 144.

Carapace and plastron without hinge.

19. *Homopus*, p. 145.

B. Alveolar surface of upper jaw with a median ridge.

20. *Testudo*, p. 149.

## 1. KACHUGA.

*Emys*, part., *Gray, Syn. Rept.* p. 20 (1831); *Dum. & Bibr.* ii. p. 232 (1835); *Gray, Cat. Tort.* p. 14 (1844).

*Batagur*, part., *Gray, Cat. Sh. Rept.* i. p. 35 (1855); *Günth. Rept. Brit. Ind.* p. 37 (1864); *Anders. Zool. Res. Yunnan*, p. 729 (1879).

*Clemmys*, part., *Strauch, Chelon. Stud.* p. 28 (1862).

*Kachuga*, part., *Gray, Cat. Sh. Rept.* i. p. 35.

*Pangshura*, *Gray, l. c.* p. 36; *Günth. l. c.* p. 33; *Gray, Suppl. Cat. Sh. Rept.* i. p. 60 (1870).

*Batagurella*, *Gray, Proc. Zool. Soc.* 1869, p. 200.

*Dongoka*, part., *Gray, l. c.* p. 202.

*Kachuga*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 54.

*Dhongoka*, *Gray, l. c.* p. 57.

*Cuchoa*, *Gray, l. c.* p. 61.

*Jerdonella*, *Gray, l. c.*

*Emia*, *Gray, l. c.*

Fourth vertebral shield elongate, embracing four or five neural plates; neural plates hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with extremely developed axillary and inguinal buttresses, the former connected with or nearly reaching the first rib, the latter ankylosed between the fifth and sixth costal plates; entoplastron anterior to the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces very broad, of upper jaw with a median ridge; edge of jaws denticulated; choanæ on a level with the posterior border of the eyes, or behind. Upper surface of head covered with undivided skin. Digits very broadly webbed. Tail very short, not longer in the young than in the adult.

India and Burma.

### *Synopsis of the Species.*

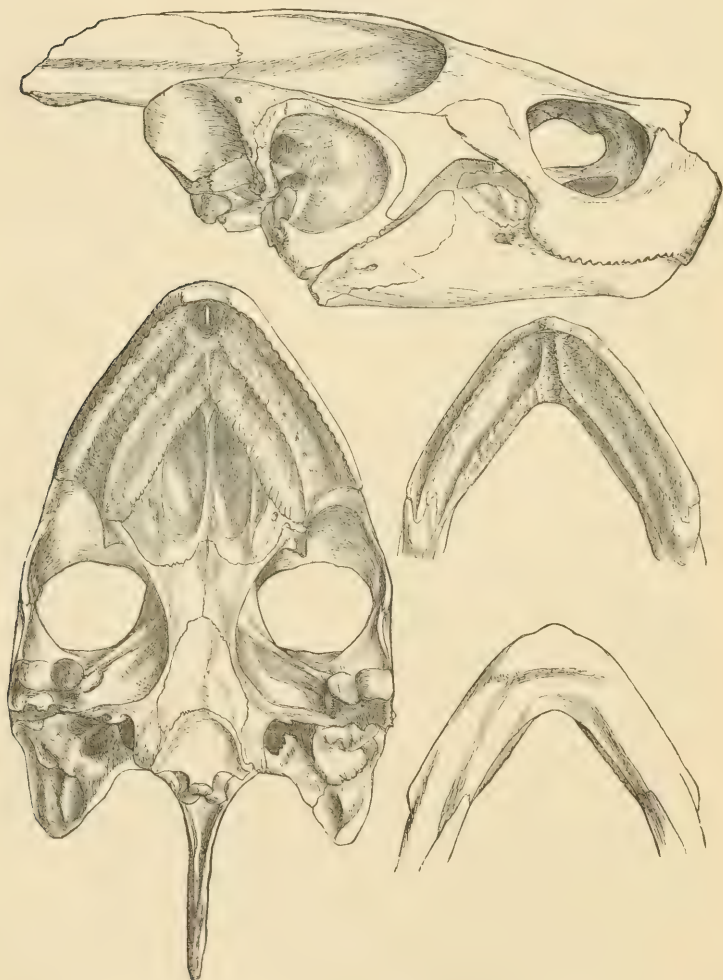
I. Third vertebral shield forming a broad suture with the fourth, which embraces four neural plates; neural plates much longer than broad.

A. Second vertebral shield with straight transverse posterior border; suture between humerals and pectorals convex or forming an obtuse angle.

Alveolar surface of upper jaw extremely broad, the median ridge nearer the

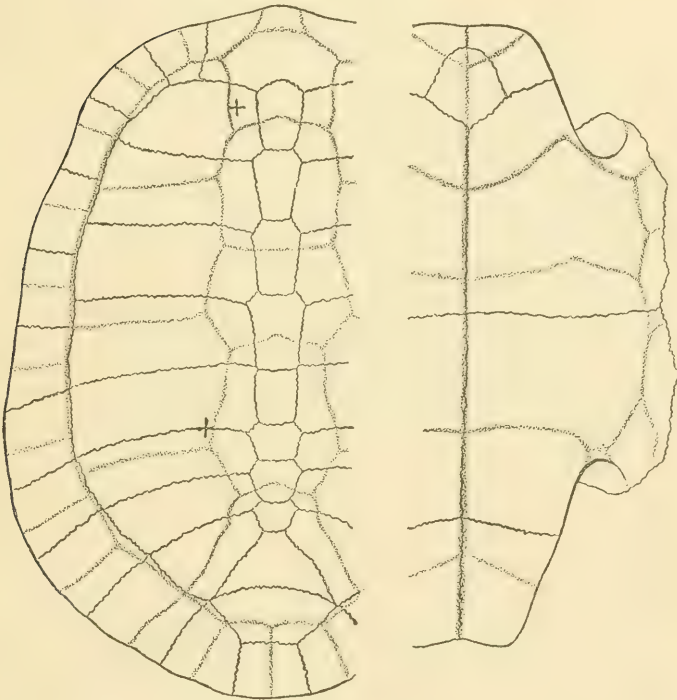
- outer than the inner margin; bony  
choanæ behind the orbits ..... 1. *lineata*, p. 54.  
Alveolar surface of upper jaw narrower,  
the median ridge nearer the inner  
than the outer margin; bony choanæ  
between the orbits..... 2. *trivittata*, p. 55.

Fig. 15.

Skull of *Kachuga trivittata*. (From Gray, P. Z. S. 1869.)

- B. Second vertebral shield pointed or produced behind, entering the third; suture between the gulars at least three fourths the length of that between the humerals; suture between gulars and humerals forming a right angle; suture between humerals and pectorals straight ..... 3. *dhongoka*, p. 56.

Fig. 16.

Shell of *Kachuga trivittata*.

- II. Fourth vertebral shield pointed in front, narrowly in contact with the third, embracing five neural plates.

- A. Third vertebral quadrangular, much longer than broad, posterior border straight or slightly convex; second vertebral shield embracing two neural plates; neural plates much longer than broad ..... 4. *smithii*, p. 57.

B. Third vertebral shield pentagonal, pointed behind; neural plates not or but slightly longer than broad.

1. Second vertebral shield much shorter than third, embracing two neural plates.

Posterior margin of carapace strongly serrated; 26 marginal shields (including caudals) .....

5. *syllhetensis*, p. 57.

Posterior margin not serrated .....

6. *intermedia*, p. 58.

2. Second vertebral shield as long as broad, embracing three neural plates .....

7. *tectum*, p. 58.

### 1. *Kachuga lineata*.

*Emys* dhor, part., *Gray, Syn. Rept.* p. 20 (1831).

— *dentata*, part., *Gray, l. c.* errata, & pls. viii., ix., and *Ill. Ind. Zool.* ii. pl. lviii. fig. 1 (1834).

— *lineata*, *Gray, l. c.* p. 23; *Dum. & Bibr.* ii. p. 335 (1835); *Gray, Cat. Tort.* p. 16 (1844).

— *kachuga*, *Gray, Ill. Ind. Zool.* i. pl. lxxiv. (1832).

*Batagur lineata*, *Gray, Cat. Sh. Rept.* i. p. 35, pl. xvii. (1855); *Günth. Rept. Brit. Ind.* p. 39 (1864); *Anders. Zool. Res. Yunnan*, p. 745 (1879).

— *dhongoka*, *Gray, l. c.* pl. xxxvi. (skull).

— *elliotti*, *Gray, Proc. Zool. Soc.* 1862, p. 264; *Günth. l. c.* p. 40, pl. iii. fig. A.

*Clemmys lineata*, *Strauch, Chelon. Stud.* p. 33 (1862).

— *elliotti*, *Strauch, Verth. Schildkr.* p. 88 (1865).

*Kachuga hardwickii*, *Gray, Proc. Zool. Soc.* 1869, p. 202.

? *Kachuga fusca*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 56 (1870).

*Kachuga lineata*, *Gray, l. c.*

— *dentata*, *Gray, l. c.*

*Dhongoka hardwickii*, part., *Gray, l. c.* p. 57.

*Batagur kachuga*, *Theob. Cat. Rept. Brit. Ind.* p. 19 (1876).

— *bakeri*, *Lydekker, Pal. Ind.* (10) iii. p. 190, pl. xxiv. fig. 5 (1885).

Carapace of young strongly keeled, the keels tubercular posteriorly on the second and third vertebral shields, posterior margin strongly crenulated; the marginal serrature disappears in adolescent specimens, and the vertebral keel, after being reduced to a series of low knobs, vanishes entirely in the fullgrown, the carapace of which is very convex. Nuchal shield small, trapezoid, broadest posteriorly; first vertebral as broad in front as behind, or broader; second vertebral longer than third, with which it forms a straight transverse suture; fourth longest and forming a broad suture with the third; second vertebral broader than long in the young, as long as broad in the adult. Plastron angulated laterally in the young; anterior and posterior lobes rather narrow and shorter than the width of the bridge, truncate anteriorly, openly notched posteriorly; the longest median suture is between the abdominals, the shortest between the gulars, which equals about one half that between the humerals; the suture between gulars and humerals forms an obtuse angle, and so does that between humerals and pectorals; inguinal

large, axillary smaller. Head moderate; snout obtuse, moderately prominent; jaws with denticulated edge, upper not notched mesially; alveolar surfaces very broad, the median ridge of the upper jaw being somewhat nearer the outer than the inner margin; choanæ behind the line of the posterior borders of the orbits; the width of the lower jaw at the symphysis equals the diameter of the orbit. Limbs with transversely enlarged, band-like scales. Brown above, yellowish inferiorly; nape with red longitudinal lines.

Length of shell 37 centim.

Northern and Central India; Burma. Fossil in the Pliocene Siwaliks.

|                   |        |                                                            |
|-------------------|--------|------------------------------------------------------------|
| a. Hgr., stffd.   | Nepal. | B. H. Hodgson, Esq. [P.].                                  |
| b. Ad., shell.    | Nepal. | B. H. Hodgson, Esq. [P.]. (Type of <i>K. fusca</i> .)      |
| c. Ad., skull.    | Nepal. | B. H. Hodgson, Esq. [P.]. (Type of <i>K. hardwickii</i> .) |
| d. Hgr., shell.   | India. | Dr. Falconer [P.].                                         |
| e. Ad., carapace. | India. | Dr. Falconer [P.].                                         |
| f. Ad., shell.    | Pegu.  | W. Theobald, Esq. [C.]. (Type of <i>K. fusca</i> .)        |
| g. Hgr., shell.   | Burma? | W. Theobald, Esq. [C.].                                    |
| h. Yg., stffd.    | —?     | (Type of <i>B. ellioti</i> .)                              |
| i. Yg., shell.    | —?     |                                                            |

## 2. *Kachuga trivittata*.

*Emys trivittata*, Dum. & Bibr. ii. p. 331 (1835); Gray, *Cat. Tort.* p. 17 (1844).

? *Emys borneoensis*, Schleg. & Müll. in Temminck, *Verh. Nat. Nederl. Ind.* p. 30 (1844).

*Clemmys dhongoka*, part., Strauch, *Chelon. Stud.* p. 33 (1862).

? *Clemmys borneoensis*, Strauch, *l. c.*

*Batagur dhongoka*, part., Blyth, *Journ. As. Soc. Beng.* xxxii. p. 84 (1863).

— *trivittata*, Theob. *Journ. Linn. Soc.* x. p. 14 (1868), and *Cat. Rept. Brit. Ind.* p. 20 (1876); Anders. *Zool. Res. Yunnan*, p. 730, pls. lxii. & lxiii. (1879); Theob. in *Mason's Burma*, i. p. 339 (1882).

*Kachuga peguensis*, Gray, *Proc. Zool. Soc.* 1869, p. 200.

— *trilineata*, Gray, *l. c.*, and *Suppl. Cat. Sh. Rept.* i. p. 54 (1870).

? *Batagur iravadica*, Anders. *l. c.* p. 736, pls. lxiv., lxv., lxviii., & lxix.

? *Batagur borneensis*, Hubrecht, *Notes Leyd. Mus.* iii. p. 47 (1881).

Differs from the preceding in the much narrower alveolar surface of the jaws, the median ridge of the upper jaw being nearer the inner than the outer margin; choanæ between the orbits; the width of the lower jaw at the symphysis is less than the diameter of the orbit. Considerable uncertainty prevails in the distinction of isolated shells of this species from the preceding. The male *B. trivittata* is characterized by three black longitudinal bands on the carapace, which are absent in the female according to Theobald, whose opinion I am disposed to endorse rather than that of



Anderson, who makes a distinct species (*B. iravadica*) for the specimens (♀ and yg. ♂) without bands.

Length of shell 55 centim.

Burma; Borneo?

|                         |        |                                                          |
|-------------------------|--------|----------------------------------------------------------|
| a. ♂, stffd.            | Burma. |                                                          |
| b-c. Eggs.              | Burma. | W. Theobald, Esq. [P.].                                  |
| d. ♂, stffd.            | Pegu.  | W. Theobald, Esq. [P.].                                  |
| e, f. ♀ & hgr., shells. | Pegu.  | W. Theobald, Esq. [P.].                                  |
| g. Ad., skull.          | Pegu.  | W. Theobald, Esq. [P.]. (Type of <i>K. trilineata</i> .) |
| h. Ad., skull.          | Pegu.  | W. Theobald, Esq. [C.]. (Type of <i>K. peguensis</i> .)  |
| i. Ad., shell.          | —?     | Dr. Falconer [P.].                                       |

### 3. *Kachuga dhongoka*.

*Emys dhongoka*, Gray, *Ill. Ind. Zool.* ii. pl. lx. (1834).

— *duvaucelii*, *Dum. & Bibr.* ii. p. 335 (1835); Gray, *Cat. Tort.* p. 15 (1844).

*Batagur dhongoka*, Gray, *Cat. Sh. Rept.* i. p. 36, pl. xviii. (1855); *Günth. Rept. Brit. Ind.* p. 42 (1864); *Theob. Cat. Rept. Brit. Ind.* p. 22 (1876).

*Clemmys dhongoka*, part., *Strauch, Chelon. Stud.* p. 33 (1862).

*Dhongoka hardwickii*, part., *Gray, Suppl. Cat. Sh. Rept.* i. p. 56 (1870).

*Pangshura leithii*, *Gray, l. c.* p. 60.

*Batagur duvaucelii*, *Anders. Zool. Res. Yunnan*, p. 738 (1879).

— *durandi*, *Lydekker, Pal. Ind.* (10) iii. p. 192, pl. xxiv. fig. 2 (1885).

Carapace much depressed, keeled in the young, the keel reduced to a knob on each of the anterior vertebrals in the adult; posterior margin erenulated. Nuchal shield small, trapezoid, broadest behind; first vertebral usually narrower in front than behind, with sinuous lateral borders; second vertebral broader than long in the young, longer than broad in the adult, posterior border pointed or more or less produced, fitting into an emargination of the third vertebral, which is shorter than either the second or the third. Plastron angulated laterally in the young; front lobe truncate, hind lobe angularly notched, shorter than the width of the bridge; the longest median suture is between the abdominals; suture between the gulars as long or nearly as long as that between the humerals; the suture between gulars and humerals forms a right angle and that between humerals and pectorals a straight transverse line; inguinal large, axillary smaller. Jaws and soft parts as in *K. trivittata*. Brown above, yellowish inferiorly; carapace with three more or less distinct black longitudinal bands.

Length of shell 35 centim.

India. Fossil in the Pliocene Siwaliks of the Punjab.

|                    |        |                           |
|--------------------|--------|---------------------------|
| a, b. Ad., shells. | Nepal. | B. H. Hodgson, Esq. [P.]. |
| c. Ad., skull.     | Nepal. | B. H. Hodgson, Esq. [P.]. |

|                              |                       |                                                         |
|------------------------------|-----------------------|---------------------------------------------------------|
| d. Hgr., stffd.              | Ganges, near Benares. | Dr. Leith [P.]. (Type of<br><i>Pangshura leithii</i> .) |
| e. Hgr., skull.              | Poonah.               |                                                         |
| f. Yg., stffd.               | — ?                   |                                                         |
| g. Yg., spir.                | — ?                   |                                                         |
| h, i, k. Ad. & hgr., shells. | — ?                   |                                                         |

4. *Kachuga smithii*. (PLATE I.)

*Batagur smithii*, Gray, *Proc. Zool. Soc.* 1863, p. 253.

*Pangshura smithii*, Günth. *Rept. Brit. Ind.* p. 36 (1864); *Theob. Cat. Rept. Brit. Ind.* p. 15 (1876); *Lydekker, Mem. Geol. Surv. Ind.* (10) iii. pl. xxii. fig. 5 (1885).

*Clemmys smithii*, Strauch, *Verth. Schildkr.* p. 89 (1865).

*Emia smithii*, Gray, *Suppl. Cat. Sh. Rept.* i. p. 62 (1870).

Carapace much depressed, feebly keeled. Nuchal shield small, trapezoid, broadest posteriorly; first vertebral with sinuous lateral borders, usually a little narrower in front than behind; second vertebral shortest, broader than long, usually with straight or slightly convex posterior border; third vertebral considerably longer than broad, subquadrangular, posterior border straight or slightly convex; fourth vertebral longest, tapering anteriorly and forming a narrow suture with the third; fifth vertebral much broader than the others. Plastron feebly angulated laterally, large; front lobe rounded, hind lobe angularly notched and as long as or a little shorter than the width of the bridge; the longest median suture is that between the abdominals, which about equals the length of the front lobe; gulars usually shorter than the suture between the humerals, their suture with the latter shields forming a right angle; inguinal large, axillary smaller. Head moderate; snout short, obtuse, feebly prominent; jaws with denticulated edge, upper not notched mesially; alveolar surface of upper jaw broad, the median ridge nearer the inner than the outer border; bony choanæ between the orbits; the width of the lower jaw at the symphysis is less than the diameter of the orbit. Fore limbs with large transverse scales. Pale olive-brown above; dorsal keel usually blackish; plastral shields and lower surface of marginals dark brown, bordered with yellow.

Length of shell 21 centim.

Upper Ganges and Indus.

|                    |                       |                               |
|--------------------|-----------------------|-------------------------------|
| a. Ad., stffd.     | India.                | Sir A. Smith [P.]. } (Types.) |
| b. Hgr., stffd.    | River Chenab, Punjab. |                               |
| c. Ad., shell.     | Indus.                | Dr. Leith [P.].               |
| d. Ad., stffd.     | India.                | T. C. Jerdon, Esq. [P.].      |
| e. Ad., shell.     | India.                | T. C. Jerdon, Esq. [P.].      |
| f, g. Ad., shells. | India.                | W. Theobald, Esq. [P.].       |

5. *Kachuga sylhetensis*.

*Pangshura sylhetensis*, Jerdon, *Proc. As. Soc. Beng.* 1870, p. 69; *Theob. Cat. Rept. Brit. Ind.* p. 15 (1876).

*Jerdonella sylhetensis*, Gray, *Suppl. Cat. Sh. Rept.* i. p. 61 (1870).

Carapace elevated, tectiform, the keel ending in an elevated pointed nodosity on the third vertebral shield, forming a strong ridge on the two last vertebrae; posterior margin very strongly serrated; 26 marginal shields instead of 24 as in all other species of the genus; first vertebral shield much broader in front than behind in the halfgrown specimens, equally broad in front and behind in the adult; second vertebral shortest, broader than long, with straight posterior border; third vertebral considerably longer than broad, pointed behind, and forming a very narrow suture with the fourth, which tapers anteriorly and equals in length the first and second together; fifth vertebral not broader than fourth, pointed posteriorly. Plastron large, feebly angulated laterally, truncate anteriorly, angularly notched posteriorly; the longest median suture is that between the abdominals; suture between the gulars as long as or shorter than that between the humerals; suture between gulars and humerals forming a right angle; inguinal and axillary large. Carapace olive-brown, usually with a lighter streak along the keel; plastral shields dark brown with a broad yellow border.

Length of shell  $18\frac{1}{2}$  centim.

Assam.

- |                                     |                                                  |                                   |
|-------------------------------------|--------------------------------------------------|-----------------------------------|
| <i>a, b, c.</i> Ad. & hgr., shells. | Sylhet, a stream at the foot of the Khasi Hills. | T. C. Jerdon, Esq. [P.]. (Types.) |
| <i>d.</i> Hgr., shell.              | Assam.                                           |                                   |

## 6. *Kachuga intermedia*.

*Emys* (Pangshura) *tectum*, var. *intermedia*, *Blanf. Journ. As. Soc. Beng.* xxxix. p. 339, pl. xiv. (1870).

Shell as in *K. tectum*, but second vertebral shield shortest and broader than long. Carapace brown; plastral shields black, with yellow anterior and lateral margins. Head dull olive, paler below; a ferruginous spot behind the eye, and three others, less well marked, in a convex line on the occiput; limbs uniform olive.

Length of shell 11 centim.

Bilaspoor, Central India.

## 7. *Kachuga tectum*.

*Emys* *tecta*, *Gray, Syn. Rept.* p. 23, pl. v. (1831), and *Ill. Ind. Zool.* i. pl. lxxii. (1832); *Dum. & Bibr.* ii. p. 321 (1835); *Gray, Cat. Tort.* p. 15 (1844); *Blyth, Journ. As. Soc. Beng.* xxii. p. 643 (1853).

— *trigibbosa*, *Lesson, Bull. Sc. Nat.* xxv. p. 120 (1831), and in *Bélang. Voy. Ind. Or., Rept.* p. 29 (1834).

— *tentoria*, *Gray, Proc. Zool. Soc.* 1834, p. 54, and *Cat. Tort.* p. 15; *Blyth, l. c.*

*Batagur tecta*, *Gray, Cat. Sh. Rept.* i. p. 36 (1855).

— *tentoria*, *Gray, l. c.* p. 37.

*Emys namadica*, *Theob. Mem. Geol. Surv. Ind.* ii. p. 295 (1860).

*Clemmys tectum*, *Strauch, Chelon. Stud.* pp. 33, 131 (1862).

— *tentoria*, *Strauch, l. c.* p. 33.

*Pangshura tecta*, *Günth. Rept. Brit. Ind.* p. 33 (1864); *Gray, Suppl.*

*Cat. Sh. Rept.* i. p. 60 (1870); *Theob. Cat. Rept. Brit. Ind.* p. 13 (1876).

*Pangshura tentoria*, *Günth. l. c.* p. 34, pl. iv. fig. C; *Theob. l. c.* p. 14.

— *flaviventer*, *Günth. l. c.* p. 35; *Theob. l. c.* p. 15; *Lydekker, Mem. Geol. Surv. Ind.* (10) iii. p. 182, pl. xxii. (1885).

— *dura*, *Gray, Proc. Zool. Soc.* 1869, p. 205.

— *ventricosa*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 60.

*Cuchoa tentoria*, *Gray, l. c.* p. 61.

— *flaviventris*, *Gray, l. c.*

Carapace elevated, tectiform, the keel ending in a nodosity on the third vertebral shield; posterior margin not or but very slightly serrated; nuchal shield small, square or trapezoid; first vertebral very variable in shape, usually with straight lateral borders diverging forwards in the halfgrown specimens, narrower in front and with sinuous lateral borders in the adult; second vertebral as long as or a little longer than second, frequently obtusely pointed behind; third vertebral pointed behind, in contact with the point of the very elongate fourth; fifth vertebral broader than the others. Plastron large, strongly angulated laterally in the young, truncate anteriorly, angularly notched posteriorly; proportions of plastral shields very variable; suture between gulars and humerals forming a right angle; axillary and inguinal large. Head moderate; snout short, rather pointed and prominent; jaws with denticulated edge, upper not notched mesially; alveolar surface of upper jaw with the median ridge nearer the inner than the outer border; bony choanae between the orbits; the width of the lower jaw at the symphysis is less than the diameter of the orbit. Fore limbs with large transverse scales. Carapace olive, of young with some black spots, especially on the posterior edge of the three first vertebrae; an orange vertebral band, and a narrow yellow margin; more uniform in the adult; plastron orange or red, with black spots, or brown with a yellowish anterior and lateral border to each shield, in one specimen uniform yellow. Head blackish; jaws and sides of crown orange; neck with numerous yellow lines on a blackish ground; limbs dark olive, spotted with yellow.

Length of shell 21 centim.

Ganges and Indus systems; fossil in the Pliocene Siwaliks.

|                                 |                |                                                                  |
|---------------------------------|----------------|------------------------------------------------------------------|
| <i>a-e.</i> Hgr., spir.         | Bengal.        | W. Theobald, Esq. [P.].                                          |
| <i>f, g, h.</i> Hgr., stffd.    | Bengal.        | M. Picquot [C.].                                                 |
| <i>i.</i> Hgr., spir.           | N.E. Bengal.   | T. C. Jerdon, Esq. [P.].                                         |
| <i>k.</i> Ad., shell.           | Assam.         | T. C. Jerdon, Esq. [C.]. (Type of <i>Pangshura ventricosa</i> .) |
| <i>l.</i> Ad., shell.           | Cuttack River. | F. Day, Esq. [P.].                                               |
| <i>m.</i> Ad., stffd.           | Deccan.        | Col. Sykes [P.]. (Type of <i>Emys tentoria</i> .)                |
| <i>n.</i> Hgr., shell.          | Deccan.        | Dr. Leith [P.].                                                  |
| <i>o.</i> Ad., stffd.           | India.         | R. McClelland, Esq. (Type of <i>Pangshura flaviventer</i> .)     |
| <i>p, q, r, s.</i> Ad., shells. | India.         | T. C. Jerdon, Esq. [P.].                                         |
| <i>t.</i> Ad., stffd.           | India.         | Dr. J. E. Gray [P.].                                             |
| <i>u, v.</i> Hgr., spir.        | India.         |                                                                  |
| <i>w.</i> Ad., skel.            | India.         |                                                                  |
| <i>x.</i> Hgr., shell.          | India.         |                                                                  |

## 2. CALLAGUR.

- Clemmys, part., *Strauch, Chelon. Stud.* p. 28 (1862).  
 Batagur, part., *Günth. Rept. Brit. Ind.* p. 37 (1864).  
 Kachuga, part., *Gray, Proc. Zool. Soc.* 1869, p. 200.  
 Callagur, *Gray, Suppl. Cat. Sh. Rept.* i. p. 53 (1870).  
 Cantorella, *Gray, l. c.* p. 58.

Neural plates elongate, hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with extremely developed axillary and inguinal buttresses, the former connected with the first rib, the latter anchylosed between the fifth and sixth costal plates; entoplastron anterior to the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces broad, of upper jaw with a median ridge; edge of jaws denticulated; choanæ between the eyes. Upper surface of head covered with undivided skin. Digits very broadly webbed. Tail very short, not longer in the young than in the adult.

Malay Peninsula; Borneo.

1. *Callagur picta*.

- Emys trivittata* (non D. & B.), *Cantor, Cat. Mal. Rept.* p. 4 (1847).  
*Tetraonyx affinis*, part., *Cantor, l. c.* p. 6.  
*Batagur picta*, *Gray, Proc. Zool. Soc.* 1862, p. 204.  
 — *affinis*, *Günth. Rept. Brit. Ind.* p. 40, pl. iii. fig. C (1864);  
*Theob. Cat. Rept. Brit. Ind.* p. 19 (1876).  
*Clemmys grayi*, *Strauch, Verth. Schildkr.* p. 88 (1865).  
*Kachuga affinis*, *Gray, Proc. Zool. Soc.* 1869, p. 203.  
*Callagur picta*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 53 (1870).  
*Cantorella affinis*, *Gray, l. c.* p. 58.  
*Kachuga major*, *Gray, Ann. & Mag. N. H.* (4) xi. p. 300 (1873).  
*Tetraonyx pictus*, *Theob. l. c.*

Carapace with a strong continuous vertebral and a feeble interrupted costal keel in the young; these keels disappearing in the adult; nuchal absent or extremely small and linear; first vertebral as broad in front as behind, or a little broader; vertebrals 2 to 4 subequal in length, much broader than long in the young, nearly as long as broad, and nearly as broad as the costals, in the adult; postero-lateral border of the third vertebral concave. Plastron large, strongly angulated laterally in the young, convex in the adult, truncate anteriorly, notched posteriorly; the width of the bridge exceeds the length of the posterior lobe; the longest median suture is that between the abdominals, the shortest that between the gulars, which is about half that of the interhumeral suture; inguinal large, axillary smaller. Head rather small; snout pointed, produced; jaws with denticulated edge, upper feebly notched mesially; the width of the lower jaw at the symphysis is a little less than the diameter of the orbit. Limbs with transversely enlarged, band-like scales. Brown above, yellowish inferiorly; carapace with three broad blackish longitudinal bands.

Length of shell 42 centim.

Malay Peninsula and Borneo.



|                 |          |                                                              |
|-----------------|----------|--------------------------------------------------------------|
| a. Hgr., stfid. | Sarawak. | A. R. Russell, Esq. [C.] (Type.)                             |
| b. Ad., stfid.  | Pinang.  | Dr. Cantor.                                                  |
| c. Yg., spir.   | Pinang.  | Dr. Cantor. (One of the types of <i>Tetraonyx affinis</i> .) |
| d. Yg., dry.    | — ?      | (Type of <i>Kachuga major</i> .)                             |

## 3. BATAGUR.

Emys, part., *Gray, Syn. Rept.* p. 20 (1831).

*Tetraonyx* (non *Latr.*), *Lesson, in Bélang. Voy. Ind. Or., Zool.* p. 297 (1834); *Dum. & Bibr.* ii. p. 337 (1835); *Gray, Cat. Tort.* p. 29 (1844); *Anderson, Zool. Res. Yunnan,* p. 771 (1879).

Batagur, part., *Gray, Cat. Sh. Rept.* i. p. 35 (1855); *Günth. Rept. Brit. Ind.* p. 37 (1864); *Anders. l. c.* p. 729.

*Clemmys*, part., *Strauch, Chelon. Stud.* p. 28 (1862).

Batagur, *Gray, Suppl. Cat. Sh. Rept.* i. p. 51 (1870).

Neural plates elongate, hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with extremely developed axillary and inguinal buttresses, the former connected with the first rib, the latter anchylosed between the fifth and sixth costal plates; entoplastron anterior to the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces very broad, of upper jaw with two strong, slightly denticulated median ridges; edge of jaws denticulated; choanæ behind the level of the eyes. Limbs somewhat approaching the paddle-shape, very broadly webbed, with four claws. Tail very short, not longer in the young than in the adult.

Bengal, Burma, Malay Peninsula.

1. *Batagur baska*.

Emys batagur, *Gray, Syn. Rept.* p. 23 (1831), and *Ill. Ind. Zool.* ii. pl. lix. (1834).

— *baska*, *Gray, l. c.* p. 24, and *Ill. Ind. Zool.* i. pl. lxxv. (1832).

*Trionyx euvieri*, *Gray, Syn. Rept.* p. 50.

*Tetraonyx longicollis*, *Lesson, in Bélang. Voy. Ind. Or., Zool.* p. 297 (1834).

— *lessonii*, *Dum. & Bibr.* ii. p. 338, pl. xvi. fig. 1 (1835).

— *baska*, *Dum. & Bibr. t. c.* p. 341; *Theob. Cat. Rept. Brit. Ind.* p. 25 (1876).

— *batagur*, *Gray, Cat. Tort.* p. 29 (1844).

— *affinis*, part., *Cantor, Cat. Mal. Rept.* p. 6 (1847).

*Batagur baska*, *Gray, Cat. Sh. Rept.* i. p. 35, pl. xvi. (1855); *Günth. Rept. Brit. Ind.* p. 37, pl. iii. fig. B (1864); *Gray, Suppl. Cat. Sh. Rept.* i. p. 52 (1870).

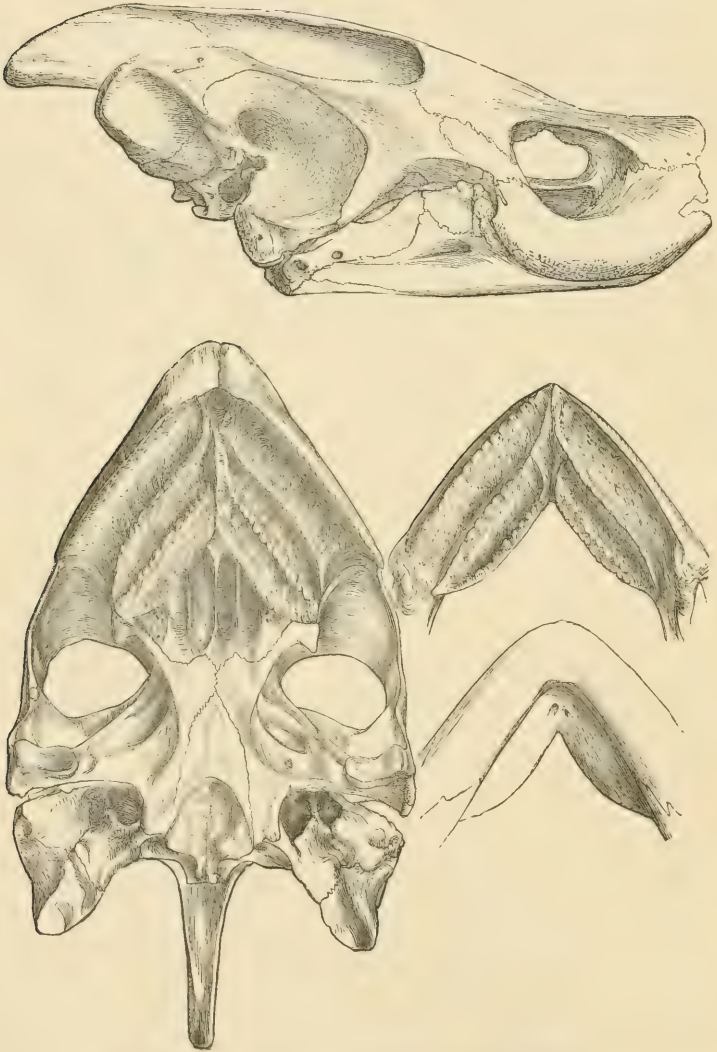
*Clemmys longicollis*, *Strauch, Chelon. Stud.* p. 33 (1862).

*Batagur* (*Tetraonyx*) *baska*, *Anders. Zool. Res. Yunnan*, p. 771, pls. lxi. & lxvii. (1879).

Carapace moderately depressed, with a vertebral keel in the young, which disappears in the adult; nuchal broader than long; first vertebral as broad in front as behind, or a little broader; vertebrals 2 to 4 subequal, much broader than long in the young, nearly as long as broad and as broad as the costals in the adult; the postero-lateral border of the third vertebral strongly concave.

Plastron large, strongly angulated laterally in the young, convex in the adult, truncate anteriorly, angularly notched posteriorly; the width of the bridge exceeds the length of the posterior lobe; the

Fig. 17.



Skull of *Latagur baska*. (From Gray, P. Z. S. 1869.)

longest median suture is that between the abdominals, the shortest that between the gulars, which is never more than half that between

the humerals; inguinal large, axillary smaller. Head rather small; snout pointed, produced, directed upwards; jaws with denticulated edge, upper feebly notched mesially; the width of the lower jaw at the symphysis nearly equals the diameter of the orbit. Limbs with transversely enlarged, band-like scales. Upper surface of shell and soft parts olive-brown, lower surface yellowish.

Length of shell 53 centim.

Bengal, Burma, Malay Peninsula.

|                                |           |                                                     |
|--------------------------------|-----------|-----------------------------------------------------|
| <i>a, b.</i> Ad., stiffd.      | Ganges.   | E. Blyth, Esq. [C.].                                |
| <i>c.</i> Ad., skull.          | Ganges.   | W. Theobald, Esq. [C.].                             |
| <i>d, e.</i> Ad., shells.      | India.    | Dr. Falconer [P.].                                  |
| <i>f.</i> Ad., shell.          | Moulmein. |                                                     |
| <i>g.</i> Ad., skull & shell.  | Rangoon.  | W. Theobald, Esq. [C.].                             |
| <i>h.</i> Ad., shell.          | Pegu.     | W. Theobald, Esq. [C.].                             |
| <i>i, k.</i> Yg., spir. & dry. | Pinang.   | Dr. Cantor.                                         |
|                                |           | (Two of the types of<br><i>Tetraonyx affinis.</i> ) |
| <i>l.</i> Head, spir.          | — ?       | W. Theobald, Esq. [C.].                             |

#### 4. HARDELLA.

Emys, part., *Gray, Syn. Rept.* p. 20 (1831); *Dum. & Bibr.* ii. p. 232 (1835); *Gray, Cat. Tort.* p. 14 (1844), and *Sh. Rept.* i. p. 19 (1855); *Günth. Rept. Brit. Ind.* p. 21 (1864).

Clemmys, part., *Strauch, Chelon. Stud.* p. 28 (1862).

Kachuga, part., *Gray, Proc. Zool. Soc.* 1869, p. 200.

Hardella, *Gray, Suppl. Cat. Sh. Rept.* i. p. 58 (1870); *Anders. Zool. Res. Yunnan*, p. 764 (1879).

Batagur, part., *Anders. l. c.* p. 729.

Neural plates elongate, hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with extremely developed axillary and inguinal buttresses, the former connected with the first rib, the latter anchylosed between the fifth and sixth costal plates; entoplastron anterior to the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces very broad, of upper jaw with a strong tubercular median ridge; edge of jaws strongly toothed; choanæ behind the level of the eyes. Upper surface of snout and crown covered with a single shield, behind which the skin is corrugated. Digits extensively webbed. Tail short, not longer in the young than in the adult.

Northern India.

#### 1. *Hardella thurgi*.

Emys thurjii, *Gray, Syn. Rept.* p. 22 (1831), and *Ill. Ind. Zool.* i. pl. lxxiii. (1832); *Dum. & Bibr.* ii. p. 318 (1835).

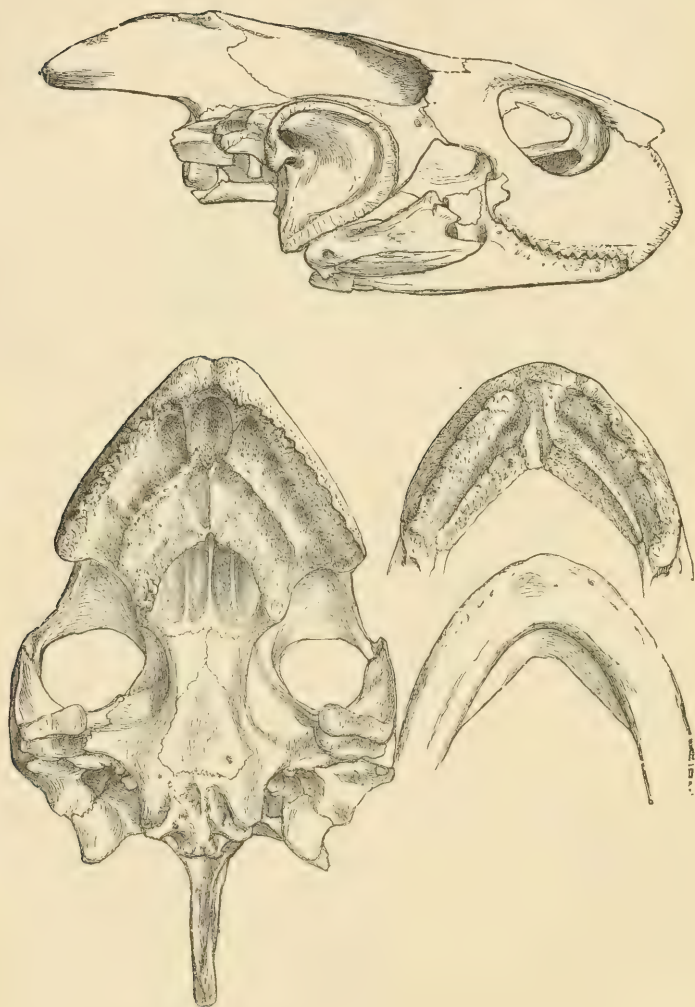
— flavonigra, *Lesson, Bull. Sc. Nat.* xxv. p. 120 (1831), and in *Bélang. Voy. Ind. Or., Zool.* p. 293 (1834).

— thurgii, *Gray, Cat. Tort.* p. 17 (1844), and *Sh. Rept.* i. p. 21 (1855); *Günth. Rept. Brit. Ind.* p. 24 (1864).

Clemmys thurgii, *Strauch, Chelon. Stud.* p. 32 (1862).

Batagur thurgii, *Theob. Cat. Rept. As. Soc. Mus.* p. 12 (1868), and *Cat. Rept. Brit. Ind.* p. 23 (1876).

Fig. 18.

Skull of *Hardella thurgi*. (From Gray, P. Z. S. 1869.)

*Kachuga oldhami*, Gray, *Proc. Zool. Soc.* 1869, p. 200, fig.

*Hardella thurgi*, Gray, *Suppl. Cat. Sh. Rept.* i. p. 58 (1870).

— *indi*, Gray, *l. c.*

*Batagur (Hardella) thurgi*, Anders. *Zool. Res. Yunnan*, p. 764.

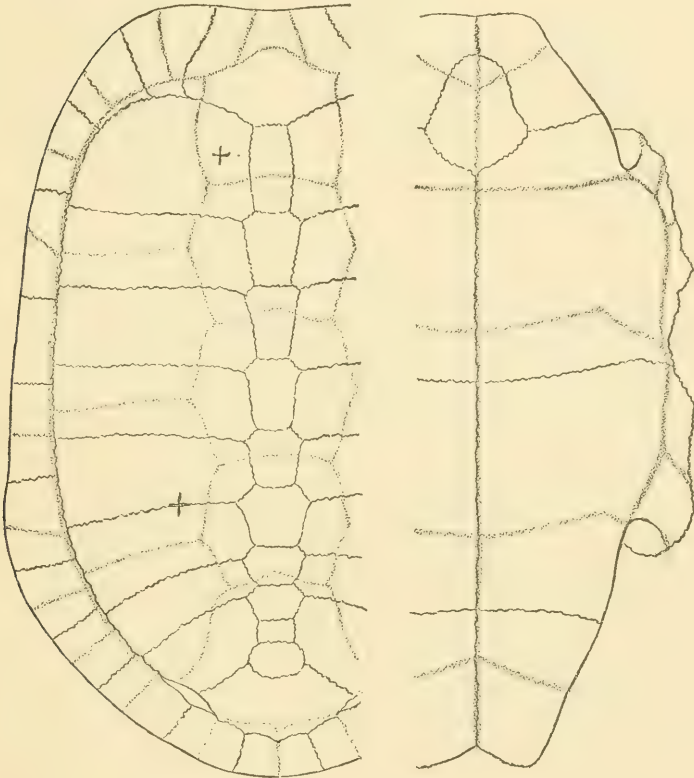
— *falconeri*, Lydekker, *Pal. Ind.* (10) iii. p. 187, pl. xxiii. fig. 1, pl. xxiv. fig. 4, & pl. xxv. figs. 1 & 2 (1885).

— *cautleyi*, Lydekker, *l. c.* p. 194, pl. xxiv. fig. 1.

*Clemmys watsonii*, Lydekker, *Q. J. Geol. Soc.* xlii. p. 540, pl. xv (1886).

Carapace moderately depressed, with an interrupted tubercular keel; margin not serrated; nuchal narrow, broadest posteriorly; first vertebral usually narrower anteriorly than posteriorly, lateral borders usually slightly sinuous; second, third, and fourth vertebrae considerably broader than long in the young, nearly as long as broad in the adult. Plastron large, angulated laterally, truncate anteriorly, angularly notched posteriorly; the width of the bridge

Fig. 19.

Shell of *Hardella thurgi*.

exceeds the length of the posterior lobe; the longest median suture is that between the abdominals; suture between the gulars as long as or a little shorter (at least three fourths) than that between the humerals; inguinal large, axillary smaller. Head moderate; snout short, obtuse; upper jaw notched mesially, serrated; lower jaw very strongly dentated, flat inferiorly, its width at the symphysis a little less than the diameter of the orbit. Limbs with transversely



enlarged, band-like scales. Carapace dark brown or black; plastron yellowish, with a large blackish spot occupying the greater part of each shield, or entirely black. Soft parts dark brown; a yellow band across the praefrontal region, extending on each side, through the eye, to above the ear; another from below each eye, passing below the nostrils.

Length of shell 45 centim. (♀). Males much smaller.

Northern India (Ganges and Indus systems). Fossil in the Pliocene Siwaliks.

|                  |         |                                   |
|------------------|---------|-----------------------------------|
| a. ♀, stfid.     | Bengal. | M. Picquot [C.].                  |
| b. ♀, stfid.     | Bengal. | R. McClelland, Esq. [C.].         |
| c. Yg., stfid.   | Bengal. |                                   |
| d. ♀, skel.      | Bengal. |                                   |
| e. ♀, shell.     | Bengal. | T. C. Jerdon, Esq. [C.].          |
| f, g. ♀, shells. | Bengal. | W. Theobald, Esq. [E.].           |
| h. Skull.        | Bengal. | Prof. Oldham [P.].                |
|                  |         | (Type of <i>Kachuga oldhami</i> ) |
| i. ♀, shell.     | Indus.  | Dr. Leith [P.].                   |
|                  |         | (Type of <i>Hardella indi</i> .)  |

## 5. MORENIA.

Emys, part., *Dum. & Bibr.* ii. p. 232 (1835); *Gray, Cat. Tort.* p. 14 (1844); *Günth. Rept. Brit. Ind.* p. 21 (1864).

Batagur, part., *Gray, Cat. Sh. Rept.* i. p. 35 (1855); *Anders. Zool. Res. Yunnan*, p. 729 (1879).

Kachuga, part., *Gray, l. c., and Proc. Zool. Soc.* 1869, p. 200.

Clemmys, part., *Strauch, Chelon. Stud.* p. 28 (1862).

Morenia, *Gray, Suppl. Cat. Sh. Rept.* i. p. 62 (1870); *Anders. l. c.* p. 755.

Neural plates hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with short axillary and inguinal buttresses, just reaching the first and fifth costal plates; entoplastron anterior to the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces very broad, of upper jaw with a strong tuberculate median ridge; edge of jaws strongly toothed; choanæ behind the level of the eyes. Upper surface of snout and crown covered with a single shield, behind which the skin is corrugated. Digits extensively webbed. Tail short, not longer in the young than in the adult.

Northern India and Burma.

### 1. *Morenia ocellata*.

*Emys ocellata*, *Dum. & Bibr.* ii. p. 329, pl. xv. fig. 1 (1835); *Gray, Cat. Tort.* p. 18 (1844); *Blyth, Journ. As. Soc. Beng.* xxii. p. 645 (1853); *Günth. Rept. Brit. Ind.* p. 22 (1864).

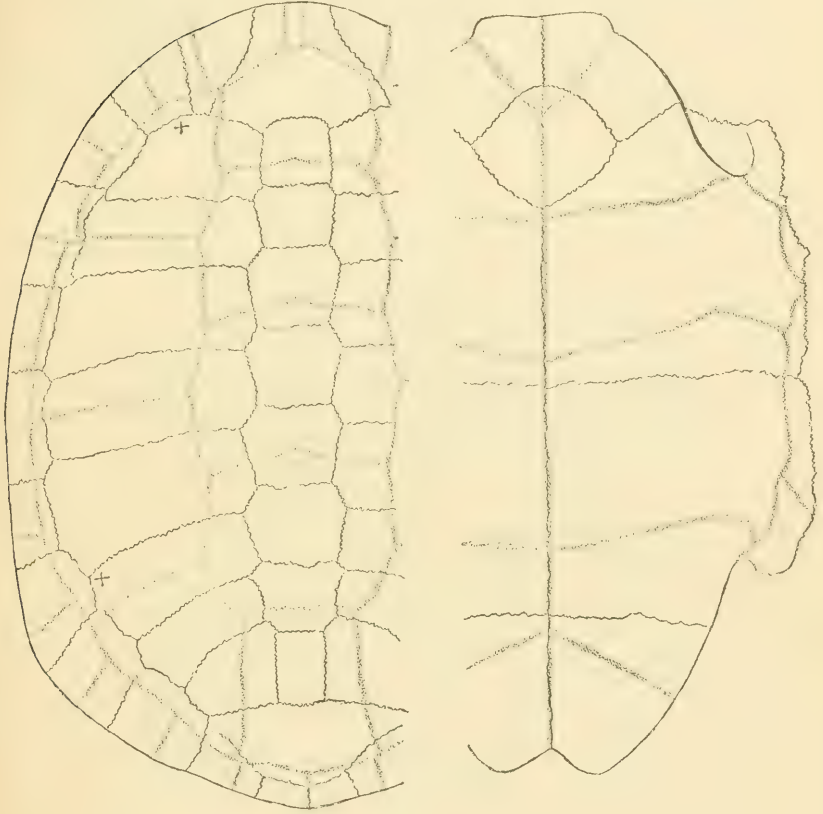
Batagur ocellata, *Gray, Cat. Sh. Rept.* i. p. 36 (1855), and *Proc. Zool. Soc.* 1856, p. 182, pl. x.

*Clemmys ocellata*, *Strauch, Chelon. Stud.* p. 33 (1862).

*Emys berdmorei*, *Blyth, Journ. As. Soc. Beng.* xxvii. p. 281 (1858).

- Batagur berdmorei*, Blyth, *Journ. As. Soc. Beng.* xxxii. p. 82 (1863);  
*Theob. Journ. Linn. Soc.* x. p. 16 (1868), and *Cat. Rept. As. Soc. Mus.* p. 12, pl. — (1868).  
*Kachuga berdmorei*, Gray, *Proc. Zool. Soc.* 1869, p. 204.  
*Morenia berdmorei*, Gray, *Suppl. Cat. Sh. Rept.* i. p. 62 (1870);  
*Theob. Cat. Rept. Brit. Ind.* p. 17 (1876).  
*Batagur (Morenia) ocellata*, Anders. *Zool. Res. Yunnan*, p. 755, pls. lx. & lxi. (1879).

Fig. 20.

Shell of *Morenia ocellata*.

Carapace moderately depressed, with a strong, interrupted, tubercular keel in the young, which becomes fainter in the adult; margin not serrated; nuchal narrow; first vertebral not or but little broader anteriorly than posteriorly, lateral borders usually sinuous; second, third, and fourth vertebrae broader than long or as long as

broad, narrower than the costals. Plastron large, angulated laterally, truncate anteriorly, notched posteriorly; the width of the bridge exceeds the length of the hind lobe; the longest median suture is that between the abdominals; suture between the gulars as long as or shorter than that between the humerals; axillary and inguinal large. Head moderate; snout short, obtuse; upper jaw notched mesially, denticulated; lower jaw strongly serrated, flat inferiorly, its width at the symphysis equalling the diameter of the orbit. Scales on limbs small; digits broadly webbed. Tail very short. Carapace brown, each shield of the disk with a large central blackish ocellus encircled with yellowish; lower surface uniform yellow. Head olive, with yellow markings; a yellow streak running above the canthus rostralis, supraciliary edge, and temple, and another from behind the eye to above the ear.

Length of shell: ♀, 22 centim.; ♂, 15.

Burma.

|                                          |         |                         |
|------------------------------------------|---------|-------------------------|
| <i>a-b.</i> Yg., spir.                   | Pegu.   | W. Theobald, Esq. [C.]. |
| <i>c, d, e, f, g.</i> ♂ ♀ & yg., shells. | Pegu.   | W. Theobald, Esq. [C.]. |
| <i>h.</i> ♀, shell.                      | Mergui. | Prof. Oldham [P.].      |
| <i>i, k.</i> ♂ ♀, skel.                  | Burma.  |                         |

## 2. *Morenia petersii*.

*Emys ocellata* (*non D. & B.*), *Blyth, Journ. As. Soc. Beng.* xxvii. p. 281 (1858).

*Batagur ocellata*, *Blyth, Journ. As. Soc. Beng.* xxxii. p. 82 (1863); *Theob. Cat. Rept. As. Soc. Mus.* p. 13 (1868).

*Morenia ocellata*, *Theob. Cat. Rept. Brit. Ind.* p. 18 (1876).

*Batagur* (*Morenia*) *petersii*, *Anders. Zool. Res. Yunnan*, p. 761, pl. lix. (1879).

Very closely allied to the preceding. Snout much more pointed and relatively longer\*. Suture between the pectorals not shorter than that between the abdominals. Carapace black, each vertebral with a narrow yellowish mesial line; the four last vertebrae with a yellowish linear horseshoe mark with the ends directed forwards; each costal with an ocellus placed rather low and formed by a narrow yellowish line, above which are some irregular looped lines of similar colour; the nuchal and each marginal with a vertical narrow yellowish mesial streak; plastron yellow. Three yellow streaks on each side of the head, the lower extending from below the nostril to the angle of the mouth.

Length of shell: ♂, 125 millim.; ♀, 200.

Bengal.

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\* The character derived from the connections of the axillary shield, indicated by Anderson, is not constant in our series of *M. ocellata*, and therefore cannot serve to distinguish the two species.

## 6. CHRYSEMYS.

*Emys*, part., *Dum. Zool. Anal.* p. 76 (1806); *Dum. & Bibr.* ii. p. 232 (1835); *Gray, Cat. Tort.* p. 14 (1844), and *Cat. Sh. Rept.* i. p. 19 (1855).

*Clemmys*, part., *Wagler, Syst. Amph.* p. 136 (1830); *Strauch, Chelon. Stud.* p. 28 (1862).

*Terrapene* (*non Merr.*), part., *Bonap. Osserv. s. sec. Ed. d. R. A.* p. 153 (1830).

*Chrysemys*, *Gray, Cat. Tort.* p. 27, and *Sh. Rept.* i. p. 32; *Agassiz, Contr. N. H. U. S.* i. p. 438 (1857).

*Pseudemys*, *Gray, Cat. Sh. Rept.* i. p. 33, and *Suppl.* i. p. 45 (1870).

*Ptychemys*, *Agassiz, l. c.* p. 431.

*Trachemys*, *Agassiz, l. c.* p. 434; *Gray, Suppl.* p. 47.

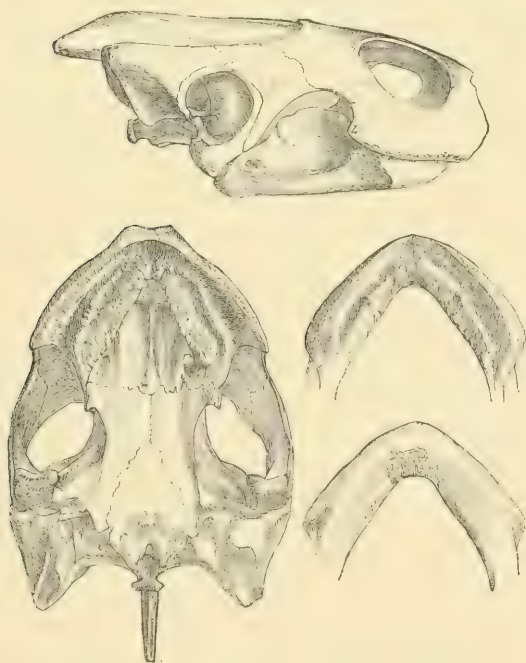
*Nectemys*, *Agassiz, op. cit.* ii. p. 642.

*Deirochelys*, *Agassiz, l. c.* p. 441; *Gray, Suppl.* p. 39.

*Callichelys*, *Gray, Ann. & Mag. N. H.* (3) xii. p. 181 (1863), and *Suppl. Cat. Sh. Rept.* p. 48.

*Redamia*, *Gray, Suppl.* p. 35.

Fig. 21.

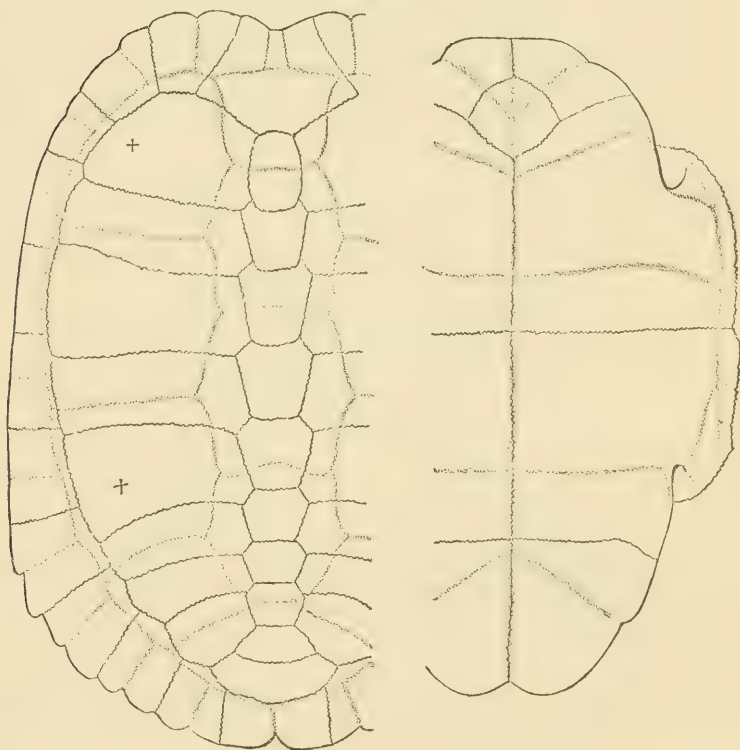
Skull of *Chrysemys scripta*. (From Gray, P. Z. S. 1869.)

Neural plates hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with short or moderately

long axillary and inguinal buttresses, the latter anchylosed to the fifth costal plates; entoplastron anterior to the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces broad, of upper jaw with a median ridge; choanæ between the eyes. Upper surface of head covered with undivided skin. Digits entirely webbed. Tail short or moderate.

North and Central America; Southern Brazil, Uruguay, Buenos Ayres.

Fig. 22.



Shell of *Chrysemys scripta*.

*Synopsis of the Species.*

I. Alveolar surface of upper jaw narrower at the symphysis than on the sides, the median ridge not or but finely denticulated; outer surface of mandible arched.

A. Plastron as large as the opening of the shell, the width of the



hind lobe more than two thirds the width of the carapace in the adult; carapace smooth, without trace of a keel, even in the young.

Vertebrae 2 to 4 with the antero-lateral borders much shorter than the postero-lateral..... 1. *picta*, p. 72.

Vertebrae hexagonal, the antero-lateral and postero-lateral borders subequal in length..... 2. *cinerea*, p. 73.

B. The width of the hind plastral bone not more than two thirds the width of the carapace; latter keeled in the young.

1. Interorbital space hardly half the horizontal diameter of the orbit . 3. *reticulata*, p. 75.

2. Head very small; shell very much depressed, smooth or nearly so in the adult.

Posterior border of carapace scarcely serrated ..... 4. *troostii*, p. 76.

Posterior border of carapace serrated .... 5. *hieroglyphica*, p. 76.

3. Head moderate or large.

a. Snout short, obtuse, feebly projecting; nostrils terminal.

Posterior border of carapace serrated, each marginal being notched; dorsal shields longitudinally rugose in the adult .... 6. *scripta*, p. 77.

Posterior marginals notched; carapace nearly smooth in the adult ..... 7. *dorbignyi*, p. 80.

Posterior marginals not notched; dorsal shields longitudinally rugose in the adult. 8. *ornata*, p. 80.

b. Snout pointed, strongly projecting, nostrils below the end of the snout ..... 9. *grayi*, p. 82.

II. Alveolar surface of upper jaw very broad all round, with a strong, tuberculate or serrated median ridge; outer surface of mandible flat.

Beak scarcely emarginate mesially; edge of jaws not or but very slightly serrated .. 10. *concinna*, p. 83.

Beak notched mesially, with a prominent cusp on each side; edge of both jaws strongly serrated ..... 11. *rubriventris*, p. 84.

Beak deeply notched mesially, with a prominent cusp on each side; edge of upper jaw finely serrated, of lower jaw more strongly and more coarsely ..... 12. *mobiliensis*, p. 85.

1. *Chrysemys picta*.

- Testudo picta*, *Schneid. Schildkr.* p. 348 (1783); *Schoepff, Testud.* p. 20, pl. iv. (1792); *Daud. Rept.* ii. p. 164 (1802); *Leconte, Ann. Lyc. N. Y.* iii. p. 115 (1830).  
 — *cinerea*, *Schneid. Schr. Ges. Naturf. Fr.* x. p. 268 (1792).  
*Emys picta*, *Schweigg. Prodr.* p. 37 (1814); *Say, Journ. Ac. Philad.* iv. p. 211 (1825); *Dum. & Bibr.* ii. p. 297 (1835); *Holbr. N. Am. Herp.* i. p. 75, pl. x. (1842); *Dekay, Faun. N. Y., Rept.* p. 12, pl. v. fig. 10 (1842); *Gray, Cat. Tort.* p. 27 (1844); *Wied, N. Acta Ac. Leop.-Carol.* xxxii. i. p. 12 (1865).  
*Terrapene picta*, *Bonap. Observ. s. sec. Ed. d. R. A.* p. 158 (1830).  
*Chrysemys picta*, *Gray, Cat. Sh. Rept.* i. p. 32 (1855); *Agassiz, Contr. N. H. U. S.* i. p. 438, pl. i. figs. 1-5, & pl. iii. fig. 4 (1857); *Gray, Suppl. Cat. Sh. Rept.* i. p. 39 (1870), and *Ann. & Mag. N. H.* (4) xi. p. 146 (1873).  
*Clemmys picta*, *Strauch, Chelon. Stud.* p. 129 (1862), and *Verth. Schildkr.* p. 83 (1865).

Carapace much depressed, quite smooth, without trace of a keel, even in the young; nuchal and anterior marginals elongate, with denticulated edge in the adult; first vertebral shield much narrower, and usually shorter, than second, not or but little broader in front than behind; vertebrals 2 to 4 broader than long (second sometimes as long as broad), as broad as or broader than the costals, the antero-lateral borders much shorter than the postero-laterals; posterior margin of carapace not serrated. Plastron very large, as large as the opening of the shell; front and hind lobes truncate, and sometimes finely denticulated at the end; the width of the hind lobe is more than two thirds the width of the carapace in the adult, and its length equals the width of the bridge; the largest shields are the abdominals, which are about twice as long as the pectorals; gulars and anals subequal in length; the shortest median suture is that between the humerals; inguinal and axillary large, latter largest. Head moderate; snout short, feebly projecting; upper jaw with a small median notch and a small cusp on each side, the edge not or but very slightly denticulated; alveolar surfaces moderately broad, with feeble median ridge; the width of the mandible at the symphysis is much less than the horizontal diameter of the eye. Digits webbed to the claws, which are very long in the adult, especially males\*. Tail one half to two thirds the length of the shell in the young, one third to two fifths in the males, less than one third in the females. Carapace dark brownish olive or blackish, with a yellow vertebral line and a broad yellow band on the anterior line of the vertebral and costal shields (exclusive of the first); this yellow border forms a continuous, nearly straight band across the carapace between marginals 7; marginals red, with black concentric or crescentic markings; plastron yellow, usually uniform, sometimes with a small symmetrical blackish marking on the

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\* Males may be distinguished by the position of the anus, which opens beyond the border of the carapace.

median line, between pectorals and anals; the greater portion of the plastral bridge red, with wavy black longitudinal bands. Soft parts dark brown or blackish, elegantly marked with yellow symmetrical lines and bands on the head, and red bands on the neck, limbs, and tail; the bands under the neck usually form three forks, one in the middle, with the base on the chin, and one on each side, the upper branch of which extends to below the eye; usually a large oblong yellow spot behind the eye, and one on each side of the occiput.

Length of shell 15 centim.

Eastern North America, from New Brunswick to Georgia.

|                             |             |                          |
|-----------------------------|-------------|--------------------------|
| <i>a-b.</i> ♀ & hgr., spir. | New York.   |                          |
| <i>c-g.</i> ♂ ♀, spir.      | N. America. | Capt. J. Anderson [P.].  |
| <i>h.</i> Ad., skel.        | N. America. | Capt. J. Anderson [P.].  |
| <i>i.</i> ♀, stffid.        | N. America. | H. Doubleday, Esq. [P.]. |
| <i>k.</i> Yg., spir.        | N. America. | H. Doubleday, Esq. [P.]. |
| <i>l.</i> ♀, spir.          | N. America. | Smithsonian Institution. |
| <i>m, n.</i> ♂ ♀, stffid.   | N. America. | Dr. J. E. Gray [P.].     |
| <i>o.</i> Hgr., spir.       | N. America. | Lord Ampthill [P.].      |
| <i>p, q.</i> ♂, stffid.     | N. America. |                          |
| <i>r.</i> Yg., dry.         | N. America. |                          |
| <i>s, t.</i> Ad., shells.   | N. America. |                          |

## 2. *Chrysemys cinerea*.

*Brown, Ill. Zool.* p. 116, pl. xlviii. figs. 1 & 2 (1776).

*Testudo cinerea*, *Bonnaterre, Encycl. Méth., Erp.* p. 25 (1789); *Schoepff,*

*Testud.* p. 18, pl. iii. fig. 3 (1792).

*Emys cinerea*, *Schweigg. Prodr.* p. 37 (1814).

— *picta*, *Gravenh. Delic. Mus. Vratisl.* p. 10, pl. ii. (1829).

*Chrysemys picta*, var. 2, *Gray, Cat. Sh. Rept.* i. p. 33 (1855).

— *marginata*, *Agassiz, Contr. N. H. U. S.* i. p. 439, pl. i. fig. 6, & pl. v. figs. 1-4 (1857); *Gray, Suppl. Cat. Sh. Rept.* i. p. 39 (1870).

— *picta*, part., *Gray, Ann. & Mag. N. H.* (3) xii. p. 181 (1863).

*Clemmys picta*, var. a, *Strauch, Verth. Schildkr.* p. 84 (1865).

*Chrysemys pulchra*, part., *Gray, Ann. & Mag. N. H.* (4) xi. p. 147 (1873).

Very closely allied to the preceding. Vertebrae 2 to 4 hexagonal, the antero-lateral and postero-lateral borders subequal in length and sinuous. Coloration very similar, but the yellow borders to the dorsal shields are narrower and do not form a band right across the back; a large symmetrical blackish marking is usually present on the plastron and extends from the gulars to the anals, without producing any lateral branches anteriorly.

Length of shell 17 centim.

Wisconsin and Iowa to New York and Ohio.

|                                 |                    |                                |
|---------------------------------|--------------------|--------------------------------|
| <i>a.</i> Yg., spir.            | Madras, New York.  | Smithsonian Institution.       |
| <i>b.</i> ♀, spir.              | Racine, Wisconsin. | Smithsonian Institution.       |
| <i>c, d.</i> ♀, spir.           | N. America. }      |                                |
| <i>e, f, g, h.</i> ♂ ♀, stffid. | N. America. }      | (Types of <i>C. pulchra</i> .) |
| <i>i.</i> Shell.                | N. America.        |                                |

Var. *bellii*.

*Emys bellii*, *Gray, Syn. Rept.* p. 31 (1831); *Dum. & Bibr.* ii. p. 302 (1835); *Gray, Cat. Tort.* p. 27 (1844).

— *oregonensis*, *Harlan, Amer. Journ.* xxxi. p. 382, pl. — (1837); *Holbr. N. Am. Herp.* i. p. 107, pl. xvi. (1842); *Gray, Cat. Tort.* p. 23; *Wied, N. Acta Ac. Leop.-Carol.* xxxii. i. p. 35 (1865).

*Chrysemys bellii*, *Gray, Cat. Sh. Rept.* i. p. 33 (1855); *Agassiz, Contr. N. H. U. S.* i. p. 439, pl. vi. figs. 8 & 9 (1857); *Gray, Suppl. Cat. Sh. Rept.* i. p. 39 (1870), and *Ann. & Mag. N. H.* (4) xi. p. 147 (1873).

— *oregonensis*, *Agassiz, l. c.* p. 440, pl. iii. figs. 1-3.

— *nuttalii*, *Agassiz, op. cit.* ii. p. 642 (1857).

*Clemmys oregonensis*, *Strauch, Chelon. Stud.* p. 130 (1862).

*Chrysemys picta*, part., *Gray, Ann. & Mag. N. H.* (3) xii. p. 181 (1863).

*Clemmys picta*, vars. b et c, *Strauch, Verth. Schildkr.* p. 84 (1865).

*Chrysemys pulchra*, part., *Gray, Ann. & Mag. N. H.* (4) xi. p. 147 (1873).

Larger and less brilliantly coloured. The vertebral streak and the light border to the dorsal shields very narrow or absent; irregular, vein-like yellow lines on the dark olive dorsal shields, which are also sometimes reticulated with black; each marginal shield above divided in the middle by a yellowish streak; lower surface of marginals yellow or red with black concentric markings or ocelli. Plastron ornamented all over with a large symmetrical blackish marking, formed of spots, lines, or vermiculations, produced into horizontal branches, and with or without detached spots.

Length of shell 20 centim.

United States, West of the Ohio and the Mississippi, British Columbia.

|                               |                                |                                                         |
|-------------------------------|--------------------------------|---------------------------------------------------------|
| <i>a.</i> ♂, stfld.           | British Columbia.              | G. M. Dawson, Esq. [C.]<br>British N. A. Boundary Comm. |
| <i>b, c.</i> Ad., shells.     | British Columbia.              | J. K. Lord, Esq. [P.]                                   |
| <i>d.</i> Yg., spir.          | Walla Walla, British Columbia. | J. K. Lord, Esq. [P.]                                   |
| <i>e.</i> ♂, spir.            | Mississippi.                   | (One of the types of <i>C. pulchra</i> .)               |
| <i>f.</i> ♂, spir.            | Mississippi.                   |                                                         |
| <i>g-h, i.</i> ♀ & yg., spir. | N. America.                    |                                                         |

Var. *dorsalis*.

*Chrysemys dorsalis*, *Agassiz, Contr. N. H. U. S.* i. p. 440 (1857); *Gray, Suppl. Cat. Sh. Rept.* i. p. 39 (1870).

— *picta*, part., *Gray, Ann. & Mag. N. H.* (3) xii. p. 181 (1863).

*Clemmys picta*, var. d, *Strauch, Verth. Schildkr.* p. 84 (1865).

Vertebral shields very wide, as in the young of the allied forms. The yellow median stripe along the carapace is broader than in any

other species; the marginals are not so highly ornamented, the crescent-shaped figures occurring only on the lower surface, and quite pale; plastron uniformly golden yellow.

Mississippi and Louisiana.

### 3. *Chrysemys reticulata*.

*Testudo reticulata*, *Dawl. Rept.* ii. p. 144, pl. xxi. fig. 3 (1802);

*Leconte, Ann. Lyc. N. Y.* iii. p. 103 (1830).

*Emys reticulata*, *Schweigg. Prodr.* p. 31 (1814); *Dum. & Bibr.* ii. p. 291 (1835); *Holbr. N. Am. Herp.* i. p. 59, pl. vii. (1842).

*Terrapene reticulata*, *Bonap. Osserv. s. sec. Ed. d. R. A.* p. 155 (1830).

*Emys reticularia*, *Gray, Cat. Tort.* p. 25 (1842), and *Sh. Rept.* i. p. 27 (1855).

*Deirochelys reticulata*, *Agass. Contr. N. H. U. S.* i. p. 441, pl. i. figs. 14-16, & pl. ii. figs. 1-3.

*Clemmys reticulata*, *Strauch, Chelon. Stud.* p. 32 (1862), and *Verth. Schildkr.* p. 78 (1865).

*Deirochelys reticularia*, part., *Gray, Suppl. Cat. Sh. Rept.* i. p. 39 (1870).

*Chrysemys reticulata*, *Cope, Check-List N. Am. Rept.* p. 53 (1875).

Carapace moderately depressed, regularly ovoid in outline, obtusely keeled in the young, smooth in the adult; posterior margin not serrated; vertebral shields much broader than long, at least as broad as the costals; nuchal narrow. Plastron large, truncate anteriorly, feebly emarginate posteriorly; the width of the hind lobe is less than two thirds that of the carapace; the width of the bridge about equals the length of the hind lobe; the longest median suture is that between the abdominals, the shortest that between the humerals or the pectorals; suture between the anals a little longer than that between the femorals; axillary and inguinal shields large. Head moderate; interorbital space very narrow; upper jaw not hooked, emarginate mesially; alveolar surface as in *C. picta* (?); the width of the mandible at the symphysis much less than the horizontal diameter of the orbit. Digits webbed to the claws. Tail one third or one fourth the length of the shell. Carapace dark olive-brown, with a narrow yellow border and a wide-meshed yellowish network; plastron and lower surfaces of marginals yellow; one or two oval black spots on the bridge, and some others on the neighbouring marginals. Head and neck dark olive-brown, with yellowish lines, the two widest of which extend from the nostril to the lip, below the eye, and from below the eye to below the ear respectively; limbs marbled with yellow.

The shell reaches a length of 25 centim.; the specimen in the collection measures only  $10\frac{1}{2}$ .

United States, east of the Mississippi, as far north as North Carolina.

*a.* Hgr., stffid.

N. America.



4. *Chrysemys troostii*.

*Emys troostii*, *Holbr. N. Am. Herp.* i. p. 123, pl. xx. (1842); *Gray, Cat. Tort.* p. 42 (1844); *A. Dum. Cat. Méth. Rept.* p. 10 (1851); *Gray, Cat. Sh. Rept.* i. p. 28 (1855).

*Trachemys troostii*, *Agass. Contr. N. H. U. S.* i. p. 435 (1857); *Gray, Suppl. Cat. Sh. Rept.* i. p. 48 (1870).

*Pseudemys troostii*, *Cope, Check-List N. Am. Rept.* p. 53 (1875).

Shell subround, much depressed, ecarinate and smooth in the adult, very slightly serrated behind; nuchal almost linear. Plastron slightly emarginate behind; the longest median suture is that between the abdominals, next comes that between the anals, shortest of all that between the humerals; axillary and inguinal shields present. Head small, oval, and pointed; jaws as in *C. scripta*. Digits broadly webbed, claws very long in the male. Tail nearly one third the length of the shell in the male. Carapace dusky, tinged with green; plastron brownish yellow, with a large, black blotch on each shield; these spots are liable to become blended or altogether obsolete. Head dusky, with very obscure rays of brownish yellow; no bands on the upper surface of the neck.

Length of shell 20 centim.

Missouri, Illinois, Tennessee, Mississippi.

I should have regarded the single specimen, type of Gray's *E. olivacea*, as belonging to this species, were it not that the plastron is ornamented all over with undulated dark bands somewhat as in *C. oregonensis*. It may perhaps be considered a variety of *C. troostii*.

? *Chrysemys olivacea*.

*Emys olivacea*, *Gray, Cat. Sh. Rept.* i. p. 30, pl. xii. c (1855).

*Clemmys olivacea*, *Strauch, Chelon. Stud.* p. 32 (1862).

*Redamia olivacea*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 36 (1870), and *Ann. & Mag. N. H.* (4) x. p. 54 (1872).

*a.* Ilgr. ♂, stffid.

——?

Dr. J. E. Gray [P.]. (Type.)

5. *Chrysemys hieroglyphica*.

*Emys hieroglyphica*, *Holbr. N. Am. Herp.* i. p. 111, pl. xvii. (1842); *Gray, Cat. Tort.* p. 26 (1844) (not specimen); *A. Dum. Cat. Méth. Rept.* p. 12 (1851).

*Pseudemys* ? *hieroglyphica*, *Gray, Cat. Sh. Rept.* i. p. 34 (1855), and *Suppl.* p. 47 (1870).

*Ptychemys hieroglyphica*, *Agass. Contr. N. H. U. S.* i. p. 434 (1857).

*Clemmys hieroglyphica*, *Strauch, Chelon. Stud.* p. 33 (1862), and *Verth. Schildkr.* p. 86 (1865).

Shell oval, much depressed, ecarinate and smooth in the adult, posterior border serrated; nuchal small, narrow; first vertebral shield urceolate. Plastron emarginate behind, the longest median

suture is that between the abdominal shields, the shortest that between the humerals; axillary and inguinal shields present. Head remarkably small and narrow, snout a little pointed; upper jaw slightly emarginate mesially. Digits very broadly webbed, claws extremely long in the male. Tail about one fourth the length of the shell in the male. Carapace olive-brown, tinged with green, subdivided by broad yellowish lines into spaces of various shapes and sizes, each space being occupied by narrower concentric lines of the same colour; plastron yellow, with a dusky blotch at the external border of the pectoral and abdominal shields. Head, neck, and limbs dark brown, with yellow lines and bands.

Length of shell 30 centim.

Tennessee and Georgia.

### 6. *Chrysemys scripta*.

*Testudo scripta*, *Schoepff*, *Testud.* p. 16, pl. iii. fig. 3 (1792); *Daud. Rept.* ii. p. 140 (1802).

— *serrata*, *Daud. l. c.* p. 148, pl. xxi. figs. 1, 2; *Leconte, Ann. Lyc. N. Y.* iii. p. 105 (1830).

*Emys scripta*, *Schweigg. Prodr.* p. 28 (1814).

— *serrata*, *Schweigg. l. c.* p. 32; *Dum. & Bibr.* ii. p. 267 (1835); *Holbr. N. Am. Herp.* i. p. 49, pl. v. (1842).

*Terrapene serrata*, *Bonap. Osserv. s. sec. Ed. d. R. A.* p. 155 (1830).

*Emys scripta*, part., *Gray, Cat. Tort.* p. 23 (1844), and *Sh. Rept.* i. p. 26 (1855).

*Trachemys scabra*, *Agassiz, Contr. N. H. U. S. i.* p. 434, pl. ii. figs. 13-15 (1857).

*Clemmys serrata*, *Strauch, Chelon. Stud.* p. 32 (1862), and *Verth. Schildkr.* p. 77 (1865).

*Trachemys scripta*, *Gray, Ann. & Mag. N. H.* (3) xii. p. 181 (1863), and *Suppl. Cat. Sh. Rept.* i. p. 48 (1870).

*Pseudemys scabra*, *Cope, Check-List N. Am. Rept.* p. 52 (1875).

Carapace rather convex, keeled, serrated posteriorly, each posterior marginal being notched; shields with radiating ridges in the young, longitudinally rugose in the adult; nuchal narrow; first vertebral not or but slightly broader in front than behind, usually with sinuous lateral borders; second and third vertebrae usually broader than long, narrower than costals. Plastron truncate anteriorly, openly emarginate posteriorly; the width of the hind lobe at the utmost hardly one third the width of the carapace, its length equal, or not quite, to the width of the bridge; the longest median suture is that between the abdominal shields, the shortest that between the humerals; axillary and inguinal large. Head moderate; snout short, feebly projecting; jaws not or but very slightly denticulated, upper with a small median notch; alveolar surfaces of upper jaw broad, narrower in the middle than on the sides, with feeble median ridge; the width of the mandible at the symphysis a little less than the horizontal diameter of the orbit. Digits very broadly webbed; claws extremely long in the male. Tail short. Carapace of young with narrow dark olive lines close together on a light

ground; these lines together may form a U-shaped figure on each of the costal shields, the extremity of each branch occupying one marginal; of adult pale brownish or olive, with more or less distinct transverse darker lines on the costals, longitudinal sinuous ones on the vertebrals and concentric ones on the marginals, and some large transverse black blotches and transverse yellowish streaks on the costals; plastron and lower surfaces of marginals yellow, with a round black spot or an ocellus formed of concentric black lines on each of the latter shields; usually two or three isolated round black spots or rings on the bridge, and one to four pairs on the plastron. Head dark olive-brown, ornamented with yellow lines and bands; a ↑-shaped yellow marking on the crown; the two broadest lateral bands usually unite behind the eye, forming a C or a large yellow blotch; the yellow bands on the chin and throat wider than the interspaces between them in the young, similar to those of *C. picta* in the adult; limbs streaked with yellow.

Length of shell 24 centim.

Eastern United States, from Southern Virginia to Georgia.

|                                 |             |                      |
|---------------------------------|-------------|----------------------|
| <i>a-d.</i> Yg., spir.          | N. America. | Lord Amptill [P.].   |
| <i>e, f.</i> ♀ and yg., stffid. | N. America. | Gen. Hardwicke [P.]. |
| <i>g, h.</i> ♂, stffid.         | N. America. |                      |
| <i>i.</i> Yg., spir.            | N. America. |                      |
| <i>k.</i> ♀, skel.              | N. America. |                      |
| <i>l.</i> Hgr., shell.          | N. America. |                      |
| <i>m.</i> Carapace.             | N. America. |                      |

### Var. *elegans*.

*Emys elegans*, *Wied, Reise d. N. Amer.* i. p. 213 (1839), and *N. Acta Ac. Leop.-Carol.* xxxii. i. p. 37, pl. iv. (1865).

— *cumberlandensis*, *Holbr. N. Am. Herp.* i. p. 115, pl. xviii. (1842); *A. Dum. Cat. Méth. Rept.* p. 13 (1851).

— *holbrookii*, *Gray, Cat. Tort.* p. 23 (1844), and *Sh. Rept.* i. p. 25, pl. xv. fig. 1 (1855).

— *sanguinolenta*, *Gray, Sh. Rept.* pl. xv. fig. 1.

*Trachemys elegans*, *Agass. Contr. N. H. U. S.* i. p. 435, pl. iii. figs. 9-11 (1857).

*Clemmys elegans*, *Strauch, Chelon. Stud.* p. 32 (1862), and *Verth. Schildkr.* p. 77 (1865).

*Trachemys holbrookii*, *Gray, Ann. & Mag. N. H.* (3) xii. p. 181 (1873), and *Suppl. Cat. Sh. Rept.* i. p. 47 (1870).

— *lineata*, *Gray, Ann. & Mag. N. H.* (4) xi. p. 147 (1873).

*Pseudemys elegans*, *Cope, Check-List N. Am. Rept.* p. 53 (1875).

The typical *C. elegans* differs from *C. scripta* by a rather more elongate and more depressed carapace and in coloration; but as the differences are slight, and besides not constant, specimens occurring which partake of the characters of the two forms, I think it preferable to regard *C. elegans* as a race of *C. scripta*. The broader bright bands on the sides of the head are separate throughout, and the upper, broadest, is red; each plastral shield usually with a large

blackish spot or concentric rings; the markings on the bridge usually confluent into a longitudinal figure.

Kansas, Illinois, and Ohio to the Gulf of Mexico and the Rio Grande.

|                                                  |                    |                                       |
|--------------------------------------------------|--------------------|---------------------------------------|
| a. ♀, spir.                                      | Ohio.              |                                       |
| b. ♀, spir.                                      | Washington, Miss.  | Smithsonian Inst. [P.].               |
| c. Shell.                                        | Washington, Miss.  | Smithsonian Inst. [P.].               |
| d, e. ♂ & yg., stffd.                            | Louisiana.         |                                       |
| f. Hgr. shell.                                   | Louisiana.         | (Type of <i>Emys holbrookii</i> .)    |
| g. Yg., spir.                                    | New Orleans.       |                                       |
| h. Yg., spir.                                    | Matamoros, Mexico. | Smithsonian Inst. [P.].               |
| i. Yg., spir.                                    | N. America.        | Dr. J. E. Gray [P.].                  |
|                                                  |                    | (Type of <i>Emys sanguinolenta</i> .) |
| k. ♀, spir.                                      | N. America.        | (Type of <i>Trachemys lineata</i> .)  |
| l, m, n, o, p, q, r, s. ♂, ♀, hgr., & yg. stffd. | N. America.        |                                       |
| t. ♀, skel.                                      | N. America.        |                                       |

### Var. *rugosa*.

? *Testudo palustris*, *Gmel. S. N. i.* p. 1041 (1789).

*Testudo rugosa*, *Shaw, Zool. iii.* p. 28, pl. iv. (1802).

*Emys decussata*, *Gray, Syn. Rept.* p. 28 (1831); *Bell, Test.* p. —, pls. — (1842); *Dum. & Bibr. ii.* p. 279 (1835); *Cocteau, in Sagra, Hist. Cuba, Rept.* p. 6, pl. i. (1843); *Gray, Cat. Tort.* p. 24 (1881); *Reinh. & Lütch. Vid. Meddel.* 1862, p. 290.

— *rugosa*, *Gray, Syn. Rept.* p. 30; *Dum. & Bibr.* p. 284; *Coct. l. c.* p. 11, pl. ii.; *Gray, Cat. Tort.* p. 24, and *Sh. Rept.* i. p. 31 (1855); *Gundlach, Rep. fis.-nat. Cuba, ii.* p. 104 (1868); *Vilaró, t. c.* p. 119; *Sowerby & Lear, Tort.* pls. xlii., xliii. (1872).

— *vermiculata*, *Gray, Cat. Tort.* p. 25, and *Sh. Rept.* i. pl. xii. d. *Ptychemys decussata*, *Agassiz, Contr. N. II. U. S. i.* p. 434 (1857). *Clemmys decussata*, *Strauch, Chelon. Stud.* p. 33 (1862), and *Verth. Schildkr.* p. 81 (1865).

— *rugosa*, *Strauch, Verth. Schildkr.* p. 81.

*Emys jamao*, *Vilaró, l. c.* p. 121 (1868).

*Pseudemys decussata*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 46 (1870).

*Trachemys rugosa*, *Gray, l. c.* p. 48.

In this form, which varies greatly as to the degree of convexity of the shell, the bright bands on the soft parts have a tendency to disappear, or disappear entirely and are replaced by black marblings. The carapace may be uniform brown or olive, or blotched or marbled with black, the blotches sometimes following the borders of the shields; plastron yellowish, uniform or blotched or vermiculated with blackish, or with symmetrical sinuous or annulate dark markings; in some specimens black bands follow the sutures between the shields.

Length of shell 28 centim.

West Indies (Cuba, Jamaica, San Domingo, Porto Rico, Guadeloupe, Martinique).

|              |             |                    |
|--------------|-------------|--------------------|
| a. ♀, stffd. | S. Domingo. |                    |
| b. ♂, skel.  | S. Domingo. |                    |
| c. ♀, skel.  | S. Domingo. | Paris Museum [E.]. |

|                                                   |            |                                                          |
|---------------------------------------------------|------------|----------------------------------------------------------|
| <i>d.</i> ♀, skel.                                | Jamaica.   |                                                          |
| <i>e, f.</i> ♂, spir.                             | W. Indies. |                                                          |
| <i>g, h.</i> ♂, stfid.                            | W. Indies. |                                                          |
| <i>i.</i> Hgr., stfid.                            | W. Indies. | Dr. J. E. Gray [P.].                                     |
| <i>k.</i> Hgr., shell.                            | W. Indies. | T. Bell, Esq. [P.]. (Type<br>of <i>Emys decussata</i> .) |
| <i>l.</i> ♂, shell.                               | W. Indies. | (Type of <i>Emys vermiculata</i> .)                      |
| <i>m.</i> ♂, shell.                               | W. Indies. |                                                          |
| <i>n.</i> ♀, skel.                                | — ?        |                                                          |
| <i>o, p, q, r, s, t.</i> ♂, ♀, &<br>hgr., shells. | — ?        |                                                          |
| <i>u.</i> ♂, shell.                               | — ?        | Dr. J. E. Gray [P.].                                     |

### 7. *Chrysemys dorbignyi*.

*Emys dorbignyi*, *Dum. & Bibr.* ii. p. 272 (1835); *Gray, Cat. Tort.* p. 22 (1844); *D'Orbigny, Voy. Am. Mér., Rept.* p. 6, pl. i. (1847); *Gray, Cat. Sh. Rept.* i. p. 32 (1855).  
*Clemmys dorbignyi*, *Strauch, Chelon. Stud.* p. 32 (1862).

Very closely allied to *C. scripta*, and resembling the var. *elegans* in coloration. Differs in the following points:—Carapace less distinctly rugose, almost smooth in the adult; head of adult larger; the width of the interorbital space equals the horizontal diameter of the orbit, which also equals the width of the mandible at the symphysis. The coloration of the upper surface of the carapace and of the soft parts agrees in every respect with that of *C. elegans*, but the underside of the shell is different. A large irregular dark brown or black blotch covers the greater part of the plastron; bridge blackish, which colour extends as festoons to the lower surface of the marginals.

Length of shell 21 centim.

Southern Brazil, Uruguay, Buenos Ayres.

|                                |                            |                          |
|--------------------------------|----------------------------|--------------------------|
| <i>a-b, c.</i> ♀ & hgr., spir. | Rio Grande do Sul.         | Dr. v. Ihering [C.].     |
| <i>d.</i> ♀, skel.             | Rio Grande do Sul.         | Dr. v. Ihering [C.].     |
| <i>e.</i> Hgr., spir.          | Dept. of Soriano, Uruguay. | A. Havers, Esq.<br>[P.]. |

### 8. *Chrysemys ornata*.

*Emys ornata*, *Gray, Syn. Rept.* p. 30 (1831); *Dum. & Bibr.* ii. p. 286 (1835); *Gray, Zool. Beechey's Voy.* p. 93, pl. xxix. fig. 2 (1839), and *Cat. Tort.* p. 22 (1844), and *Sh. Rept.* i. p. 24 (1855); *Bocourt, Miss. Sc. Mex., Rept.* p. 13, pl. iii. fig. 1 (1870); *Sowerby & Lear, Tort.* pl. xlv. (1872); *Günth, Biol. C.-Am., Rept.* p. 2, pl. i. (1885).

— *venusta*, *Gray, Cat. Sh. Rept.* p. 24, pl. xii. A.

? *Emys ventricosa*, *Gray, l. c.* p. 28, pl. xiv.

? *Emys valida*, *Leconte, Proc. Ac. Philad.* 1859, p. 7.

*Clemmys ornata*, *Strauch, Chelon. Stud.* p. 32 (1862).

*Callichelys ornata*, *Gray, Ann. & Mag. N. H.* (3) xii. p. 181 (1863), and *Suppl. Cat. Sh. Rept.* i. p. 48 (1870).

— *venusta*, part., *Gray, ll. cc.* pp. 181, 49.

? *Pseudemys ventricosa*, *Gray, Suppl.* p. 46.



*Pseudemys ornata*, Cope, *Journ. Ac. Philad.* (2) viii. p. 153 (1876).

*Emys salvini*, Günth. l. c. p. 4, pls. ii., iii.

*Pseudemys salvini*, Cope, *Bull. U. S. Nat. Mus.* no. 32, p. 22 (1887).

Carapace moderately depressed; shields with radiating ridges in the young, longitudinally rugose in the adult; nuchal narrow; first vertebral not or but slightly broader in front than behind, usually with sinuous lateral borders; second and third vertebrals about as long as broad in the adult, narrower than the costals. Hind lobe of plastron notched, its width at the utmost hardly one third the width of the carapace; its length about equals the width of the bridge; the longest median suture is that between the abdominal shields, the shortest that between the humerals; axillary and inguinal large. Head moderate; snout short, feebly projecting; upper jaw not or but very slightly denticulated, with a small median notch; lower jaw coarsely denticulated in the adult; alveolar surface of upper jaw broad, narrower in the middle, with feeble median ridge; the width of the mandible at the symphysis is a little less than the horizontal diameter of the orbit. Digits very broadly webbed. Tail short. Carapace olive or brown, each costal and marginal shield with a large ocellus formed by a round or oval blackish spot, and one or more concentric yellowish rings; the centre of the ocellus situated in the postero-proximal part of the costal shield; vertebral shields with sinuous yellow longitudinal lines, sometimes forming an imperfect ring; all these markings become indistinct in old specimens. Lower parts of shell yellowish; plastron with a large symmetrical figure, formed of concentric dark lines, extending from the gulars to the anal; longitudinal dark lines across the bridge; lower surface of marginals with blackish ocelli or concentric rings, the arrangement of which alternates with that of the shields; these markings likewise disappearing with age. Head and limbs olive, with yellow or orange black-edged longitudinal streaks, of which a supratemporal is the broadest; the bands on the chin mostly continuous with those on the throat, the median branching off into two.

Length of shell 35 centim.

Central America.

|                             |            |                                                                  |
|-----------------------------|------------|------------------------------------------------------------------|
| <i>a-b</i> . Yg., spir.     | Mazatlan.  | A. Collie, Esq. [P.]<br>(Types.)                                 |
| <i>c, d</i> . ♂, ♀, stffld. | Mazatlan.  | Mr. A. Forrer [C.], O.<br>Salvin & F. D. God-<br>man, Esqs. [P.] |
| <i>e-f</i> . Yg., spir.     | Presidio.  | Mr. A. Forrer [C.], O.<br>Salvin & F. D. God-<br>man, Esqs. [P.] |
| <i>g</i> . ♀, stffld.       | Presidio.  | Mr. A. Forrer [C.], O.<br>Salvin & F. D. God-<br>man, Esqs. [P.] |
| <i>h, i</i> . ♀, stffld.    | Honduras.  | (Types of <i>Emys venusta</i> .)                                 |
| <i>k</i> . ♀, stffld.       | Mexico.    |                                                                  |
| <i>l</i> . ♂, spir.         | Guatemala. | O. Salvin, Esq. [C.]<br>(Type of <i>Emys salvini</i> .)          |

|                                  |                      |                                    |
|----------------------------------|----------------------|------------------------------------|
| <i>m.</i> Yg., spir.             | Volcano of Chiriqui. | Herbert Druce, Esq. [P.]           |
| <i>n.</i> Yg., spir.             | — ?                  | Lord Amphilhill [P.]               |
| <i>o, p, q.</i> Yg., spir.       | — ?                  |                                    |
| <i>r, s, t.</i> ♀ & hgr., stffd. | — ?                  |                                    |
| <i>u.</i> Shell and skull.       | — ?                  |                                    |
| <i>v.</i> Ad. shell.             | — ?                  | (Type of <i>Emys ventricosa</i> .) |
| <i>w, x.</i> Ad. & hgr., shells. | — ?                  |                                    |

### Var. callirostris.

*Emys callirostris*, Gray, *Cat. Sh. Rept.* i. p. 25, pl. xii. B (1855).

*Callichelys callirostris*, Gray, *Ann. & Mag. N. H.* (3) xii. p. 181 (1863), and *Suppl. Cat. Sh. Rept.* p. 49 (1870).

*Pseudemys callirostris*, Cope, *Bull. U. S. Nat. Mus.* no. 32, p. 22 (1887).

Differs from the typical form in having the yellow bands on the lips severed into round or oval spots surrounded by concentric black lines.

Perhaps only an individual variation.

*a.* Hgr., stffd. — ? Haslar Hospital. (Type.)

### Var. cataspila.

*Emys ornata*, Gray, *Cat. Sh. Rept.* pl. xii. (1855).

— *cataspila*, Günth. *Biol. C.-Am., Rept.* p. 4, pl. vi. fig. B (1885).

*Pseudemys cataspila*, Cope, *Bull. U. S. Nat. Mus.* no. 32, p. 22 (1887).

The ocelli are smaller and situated on the hinder part of the costals, nearer the marginals than the vertebrales.

|                                        |         |            |
|----------------------------------------|---------|------------|
| <i>a.</i> ♀, stffd.                    | Mexico. | } (Types.) |
| <i>b.</i> Hgr., stffd.                 | Mexico. |            |
| <i>c.</i> Yg., spir.                   | Mexico. |            |
| <i>d, e, f.</i> ♀, hgr., & yg., stffd. | — ?     |            |
| <i>g.</i> Ad., shell.                  | — ?     |            |

Dr. J. E. Gray [P.]

## 9. *Chrysemys grayi*.

*Emys grayi*, Bocourt, *Miss. Sc. Mex., Rept.* p. 13, pl. iii. fig. 2 (1870).

*Callichelys venusta*, part., Gray, *Suppl. Cat. Sh. Rept.* i. p. 49 (1870).

— *grayi*, Gray, l. c.

— *concinna* (non Leconte), Gray, *Ann. & Mag. N. H.* (4) xi. p. 148, xii. p. 110 (1873).

*Emys callirostris* (non Gray), Bocourt, *Journ. de Zool.* v. p. 387 (1876).

— *umbra*, Bocourt, in O'Shaughn. *Zool. Rec.* 1876, *Rept.* p. 6 (1878);

Günth. *Biol. C.-Am., Rept.* p. 5, pls. iv., v., and vi. fig. A (1885).

*Callichelys callirostris*, Sumichrast, *Bull. Soc. Zool. France*, 1880, p. 166.

*Pseudemys umbra*, Cope, *Bull. U. S. Nat. Mus.* no. 32, p. 22 (1887).

Differs from *C. ornata* in the following points:—Head longer

snout pointed and strongly projecting, the nostrils pierced below the end of the snout; median ridge of upper alveolar surface stronger and denticulated. Carapace brown; an oval dark spot, surrounded by a light ring in the postero-proximal part of each costal shield, close to the vertebral; plastron marbled or blotched with dark brown; a broad dark brown band across the bridge. The longitudinal bands on the head less numerous and less distinct.

West coast of Central America.

- |                                               |                         |                                                           |
|-----------------------------------------------|-------------------------|-----------------------------------------------------------|
| <i>a.</i> ♂, shell, and soft parts in spirit. | Tapana, Tehuantepec.    | F. Sumichrast [C.]. O. Salvin & F. D. Godman, Esqs. [P.]. |
| <i>b, c.</i> Ad., shells.                     | Tapana, Tehuantepec.    | F. Sumichrast [C.]. O. Salvin & F. D. Godman, Esqs. [P.]. |
| <i>d, e.</i> ♀, stfild.                       | Sao Mateo, Tehuantepec. | F. Sumichrast [C.].                                       |
| <i>f.</i> ♂, stfild.                          | Mexico.                 |                                                           |

### 10. *Chrysemys concinna*.

*Emys reticularia* (*non* Daud.), Say, *Journ. Ac. Philad.* iv. p. 204 (1825).

*Testudo floridana*, Leconte, *Ann. Lye. N. Y.* iii. p. 100 (1830).

— *concinna*, Leconte, *l. c.* p. 106.

*Terrapene floridana*, Bonap. *Osserv. s. sec. Ed. d. R. A.* p. 154 (1830).

— *concinna*, Bonap. *l. c.* p. 156.

*Emys annulifera*, Gray, *Syn. Rept.* p. 32 (1831), and *Cat. Tort.* p. 28 (1844), and *Sh. Rept.* i. p. 27 (1855).

— *floridana*, Dum. & Bibr. ii. p. 285 (1835); Holbr. *N. Am. Herp.* i. p. 65, pl. viii. (1842); Gray, *Cat. Tort.* p. 26, and *Sh. Rept.* i. p. 27.

— *concinna*, Dum. & Bibr. ii. p. 289; Holbr. *l. c.* p. 119, pl. xix.; Gray, *Cat. Tort.* p. 25.

*Pseudemys concinna*, Gray, *Cat. Sh. Rept.* i. p. 34, and *Suppl.* p. 47 (1870).

*Ptychemys concinna*, Agassiz, *Contr. N. H. U. S.* i. p. 432, pl. i. fig. 13, & pl. ii. figs. 4-6 (1857).

*Clemmys concinna*, Strauch, *Chelon. Stud.* p. 32 (1862), and *Verth. Schildkr.* p. 76 (1865).

— *floridana*, Strauch, *Chelon. Stud.* p. 32.

*Emys orthonyx*, Wied, *N. Acta Ac. Leop.-Carol.* xxxii. i. p. 23, pl. iii. (1865).

*Trachemys annulifera*, Gray, *Hand-List Sh. Rept.* p. 47 (1873).

Carapace moderately depressed, unicarinate in the young, longitudinally rugose in the adult; nuchal narrow; first vertebral with sinuous lateral borders, not broader in front than behind, and frequently narrower; second and third vertebrae as long as broad, or a little longer than broad, in the adult, narrower than the costals; posterior marginals not or but very slightly notched. Hind lobe of plastron notched, its width not one third that of the carapace; its length about equals the width of the bridge; the longest median suture is that between the abdominal shields, the shortest that between the humerals; inguinal and axillary large. Head moderate; snout very short, not projecting; upper jaw not distinctly notched

nor hooked, the edge not or but slightly denticulated; alveolar surface of upper jaw very broad all round, with a very strong, tuberculate or coarsely serrated median ridge; lower jaw very flat, with a sharp point in front, the edge serrated; the width of the mandible at the symphysis is much less than the horizontal diameter of the orbit. Digits very broadly webbed; claws very long in the males. Tail short. Carapace olive or brown, variegated with yellowish dark-edged lines sometimes forming a reticulate pattern; plastron yellow, uniform or with a few dark spots or symmetrical markings. Head with orange or red streaks, the broadest of which runs from the upper border of the orbit to the neck; chin and throat with a few orange streaks, the median bifurcating behind the mandibular symphysis.

Length of shell 40 centim.

South-eastern North America, from Missouri and North Carolina to the Gulf of Mexico.

|                        |                   |                                    |
|------------------------|-------------------|------------------------------------|
| a. Yg., spir.          | Pilatka, Florida. | Smithsonian Instit.                |
| b. ♀, stfild.          | Louisiana.        | W. P. Smith [C.].                  |
| c, d. ♂ & yg., stfild. | Louisiana.        |                                    |
| e. Yg., spir.          | N. America.       | (Type of <i>Emys annulifera</i> .) |
| f, g, h, i. ♀, stfild. | N. America.       |                                    |
| k. ♀, skel.            | N. America.       |                                    |

### 11. *Chrysemys rubriventris*.

*Emys serrata* (non Daud.), Say, *Journ. Ac. Philad.* iv. p. 204 (1825);

Gray, *Syn. Rept.* p. 29 (1831), and *Cat. Tort.* p. 21 (1844).

*Testudo rubriventris*, Leconte, *Ann. Lyc. N. Y.* iii. p. 101 (1830).

*Terrapene rubriventris*, Bonap. *Osserv. s. sec. Ed. R. A.* p. 154 (1830).

*Emys irrigata*, Dum. & Bibr. ii. p. 276 (1835).

— *rubriventris*, Dum. & Bibr. *t. c.* p. 281; *Holbr. N. Am. Herp.* ii. p. 55, pl. vi. (1842); *Dekay, Fawn. N. Y., Rept.* p. 16, pl. vii. fig. 14 (1842).

— *rivulata*, Gray, *Cat. Tort.* p. 22 (1844), and *Cat. Sh. Rept.* i. p. 27, pl. xi. (1855).

— *rugosa*, Leconte, *Proc. Ac. Philad.* 1854, p. 189.

*Pseudemys serrata*, Gray, *Sh. Rept.* i. p. 34, and *Suppl.* p. 46 (1870).

*Ptychemys rugosa*, Agass. *Contr. N. H. U. S.* i. p. 431, pls. xxvi. & xxvii. (1857).

*Clemmys rugosa*, Strauch, *Chelon. Stud.* p. 33 (1862).

— *rubriventris*, Strauch, *Verh. Schildkr.* p. 86 (1865).

*Pseudemys rugosa*, Cope, *Check-List N. Am. Rept.* p. 52 (1875).

Very closely allied to the preceding, but carapace more elongate and somewhat constricted at the sides in the adult. Both jaws strongly and coarsely serrated, upper notched mesially, with a cusp on each side. Colour of carapace very variable, sometimes very similar to that of *C. concinna*, often reddish with a black network; plastron yellow, with black blotches or symmetrical markings in the young, reddish or red in the adult.

Length of shell 27 centim.

United States, east of Ohio, from New York and New Jersey to North Carolina.

|                                        |                  |                                  |
|----------------------------------------|------------------|----------------------------------|
| <i>a.</i> Hgr., spir.                  | Washington, D.C. | Smithsonian Instit.              |
| <i>b-d.</i> Yg., spir.                 | N. America.      | Lord Amphilh [P.].               |
| <i>e, f, g.</i> ♂, ♀, & yg.,<br>stlid. | N. America.      |                                  |
| <i>h, i, k.</i> ♂ ♀, skel.             | N. America.      |                                  |
| <i>l.</i> Shell.                       | N. America.      | (Type of <i>Emys rivulata</i> .) |

## 12. *Chrysemys mobiliensis*.

*Emys mobiliensis*, *Holbr. N. Am. Herp.* i. p. 71, pl. ix. (1842); *Gray, Cat. Tort.* p. 25 (1844); *A. Dum. Cat. Méth.* p. 11 (1851).

*Ptychemys mobiliensis*, *Agassiz, Contr. N. H. U. S.* i. p. 433, pl. iii. figs. 14-16 (1857).

*Clemmys mobiliensis*, *Strauch, Chelon. Stud.* p. 32 (1862).

*Pseudemys mobiliensis*, *Gray, Ann. & Mag. N. H.* (3) xii. p. 182 (1863).

Distinguished from *C. concinna* and *C. rubriventris*, to which it is closely allied, by the greater elevation of the shell anteriorly; from the former by having the beak notched and bicuspid as in the latter, from which it differs by having the upper jaw but very finely serrated.

Borders of the Gulf of Mexico, from Florida to North Mexico.

## 7. OCADIA.

*Emys*, part., *Gray, Cat. Tort.* p. 14 (1844), and *Sh. Rept.* i. p. 19 (1855); *Günth. Rept. Brit. Ind.* p. 21 (1864).

*Clemmys*, part., *Strauch, Chelon. Stud.* p. 28 (1862).

*Ocadia*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 35 (1870).

Neural plates hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with strong axillary and inguinal buttresses, extending to halfway between the marginal and neural plates, the latter anchylosed between the fifth and sixth costal plates; entoplastron intersected by the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces broad, of upper jaw with a median ridge; choanæ between the eyes. Upper surface of head covered with undivided skin. Digits entirely webbed. Tail moderate.

China.

### 1. *Ocadia sinensis*.

*Emys sinensis*, *Gray, Proc. Zool. Soc.* 1834, p. 53, and *Cat. Tort.* p. 17 (1844), and *Sh. Rept.* i. p. 20, pl. vii. (1855); *Günth. Rept. Brit. Ind.* p. 27 (1864).

— *bennettii*, *Gray, Cat. Tort.* p. 21, and *Sh. Rept.* i. p. 22, pl. x.

*Clemmys sinensis*, *Strauch, Chelon. Stud.* p. 32 (1862).

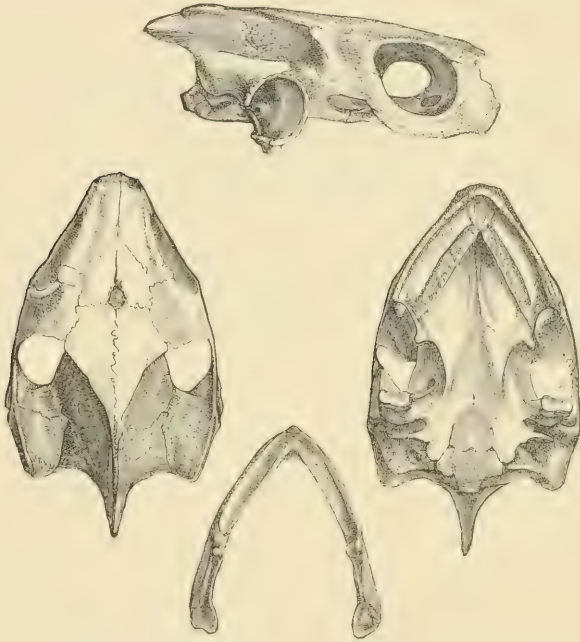
— *bennettii*, *Strauch, l. c.*, and *Verth. Schildkr.* p. 72 (1865).

*Ocadia sinensis*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 35 (1870).



Carapace moderately depressed, with three obtuse, interrupted keels in the young; the lateral keels usually disappearing in the adult; the shields smooth or concentrically striated; nuchal as broad as long, or longer than broad; first vertebral broader anteriorly than posteriorly; second and third vertebrae as long as broad, or broader

Fig. 23.



Skull of *Ocadia sinensis*. (From Gray, P. Z. S. 1873.)

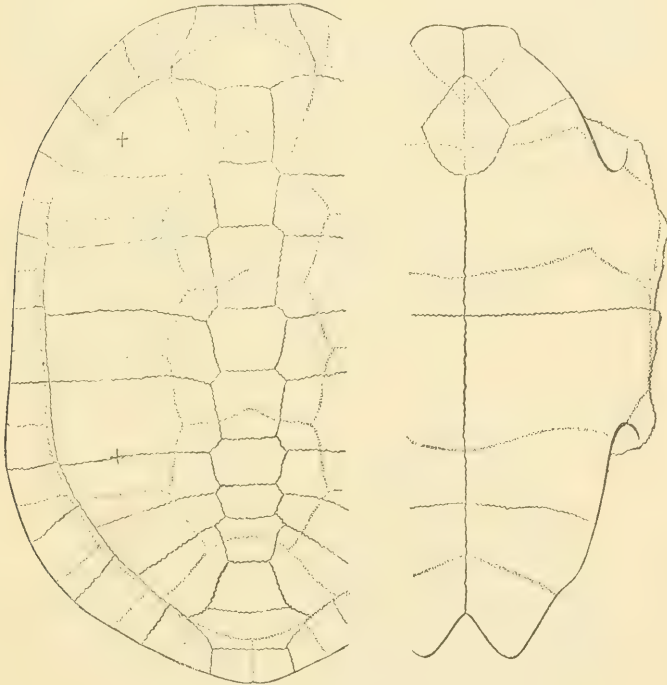
than long; posterior margin not serrated. Hind lobe of plastron notched, narrower than the opening of the shell, as long as or a little shorter than the width of the bridge; the longest median suture is that between the abdominal shields, the shortest that between the humerals; the length of the suture between the pectorals equals or exceeds that of the gulars and humerals together; inguinal and axillary large. Head rather small; snout obliquely truncate, rather strongly projecting; upper jaw not hooked, feebly notched mesially; both jaws with finely denticulated edge; alveolar surface of upper jaw broad all round, with a feeble, slightly tuberculate median ridge; the width of the mandible at the symphysis much less than the horizontal diameter of the orbit. Digits broadly webbed. Tail about two thirds the length of the shell in the young, half in the males, two fifths in the females. Carapace olive-brown,

with a yellowish spot on each of the dorsal shields; plastron yellowish, each shield with a large dark brown blotch; four round dark spots on the bridge, the two largest on the pectoral and abdominal shields, the two others on the axillary and inguinal; lower surface of marginals yellowish, each shield with a round brown spot or ocellus. Head and neck with numerous narrow, light, black-edged longitudinal lines; similar lines and reticulations on the limbs.

Length of shell 23 centim.

Southern China (Formosa and Canton).

Fig. 24.



Shell of *Ocadia sinensis*.

|                                         |                     |                                                           |
|-----------------------------------------|---------------------|-----------------------------------------------------------|
| <i>a.</i> Hgr., stfld.                  | S. China.           | J. Reeves, Esq. [P.]<br>(Type.)                           |
| <i>b-g.</i> Hgr., ♂, ♀,<br>& yg., spir. | Formosa.            | R. Swinhoe, Esq. [C.]                                     |
| <i>h.</i> Hgr., skel.                   | Formosa.            | R. Swinhoe, Esq. [C.]                                     |
| <i>i.</i> Ad., shell.                   | Formosa.            | R. Swinhoe, Esq. [C.]                                     |
| <i>k.</i> Yg., spir.                    | Taiwanfoo, Formosa. |                                                           |
| <i>l, m.</i> ♀, stfld.                  | —?                  | Zoological Society.<br>(Types of <i>Emys bennettii</i> .) |
| <i>n.</i> Hgr., shell.                  | —?                  |                                                           |

## 8. MALACOCLEMMYS.

Emys, part., *Dum. Zool. Anal.* p. 76 (1806); *Dum. & Bibr.* ii. p. 232 (1835).

Clemmys, part., *Wagler, Syst. Amph.* p. 136 (1830); *Strauch, Chelon. Stud.* p. 28 (1862).

Terrapene (*non Merr.*), part., *Bonap. Osserv. s. sec. Ed. d. R. A.* p. 153 (1830).

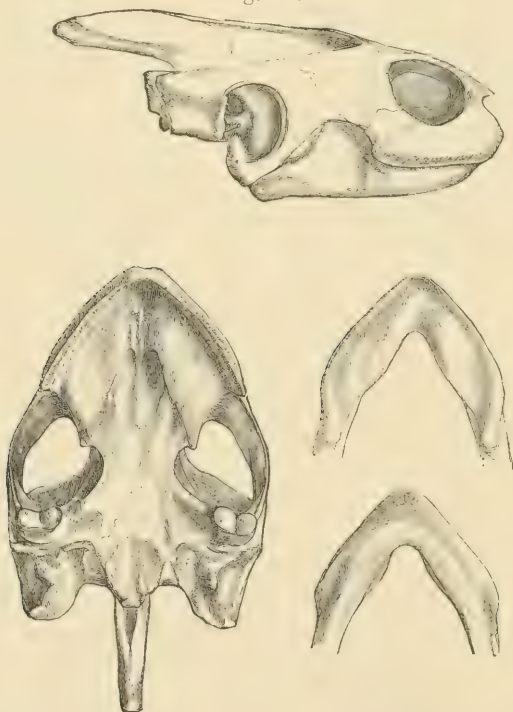
Malaclemys, *Gray, Cat. Tort.* p. 23 (1844), and *Sh. Rept.* i. p. 37 (1855), and *Suppl.* p. 41 (1870).

Graptemys, *Agassiz, Contr. N. H. U. S. i.* p. 436 (1827); *Gray, Suppl. Cat. Sh. Rept.* i. p. 45.

Malacoclemmys, *Agassiz, l. c.* p. 437.

Neural plates hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with feeble axillary and inguinal peduncles, the latter anchylosed to the fifth costal plate; entoplastron anterior to the humero-pectoral suture. Skull with a

Fig. 25.



Skull of *Malacoclemmys terrapen*. (From Gray, P. Z. S. 1869.)

bony temporal arch; alveolar surface very broad, without median ridge; choanæ behind the level of the eyes. Upper surface of head covered with undivided skin. Digits webbed. Tail short.

North America.

*Synopsis of the Species.*

- Carapace much depressed; the length of the hind lobe of the plastron much exceeds the width of the bridge . . . . . 1. *terrapen*, p. 89.
- Carapace tectiform, the vertebral keel obtuse and not tubercular; hind margin but moderately serrated . . . . . 2. *geographica*, p. 90.
- Carapace tectiform, with strong vertebral keel ending in a tubercle on each shield; posterior margin very strongly serrated . 3. *lesueurii*, p. 91.

1. *Malacoclemmys terrapen*.

- Testudo terrapin*, *Schoepff*, *Test.* p. 64, pl. xv. (1792).  
 — *centrata*, *Daud.* *Rept.* ii. p. 153 (1802).  
 — *concentrica*, *Shaw*, *Zool.* iii. p. 43, pl. ix. (1802).  
*Emys centrata*, *Schweigg.* *Prodr.* p. 32 (1814); *Say*, *Journ. Ac. Philad.* iv. p. 205 (1825).  
*Testudo palustris* (*non Gmel.*), *Leconte*, *Ann. Lyc. N. Y.* iii. p. 113 (1830).  
*Terrapene palustris*, *Bonap.* *Osserv. s. sec. Ed. d. R. A.* p. 157 (1830).  
*Emys concentrica*, *Gray*, *Syn. Rept.* p. 27 (1831); *Bell*, *Mon. Test.* pl. — (1834); *Dum. & Bibr.* ii. p. 261 (1835).  
 — *terrapin*, *Holbr. N. Am. Herp.* i. p. 87, pl. xii. (1842); *Dekay*, *Faun. N. Y., Rept.* p. 11, pl. xxiii. fig. 63 (1842); *Wied*, *N. Acta Ac. Leop.-Carol.* xxxii. i. p. 16 (1865).  
 — *palustris*, *Dekay*, *l. c.* p. 10, pl. iii. fig. 5.  
*Malaclemmys concentrica*, *Gray*, *Cat. Tort.* p. 28 (1844), and *Sh. Rept.* i. p. 37 (vars. *concentrica*, *centrata*, *tuberculifera*) (1855), and *Suppl.* p. 42 (1870).  
*Emys macrocephala*, *Gray*, *Cat. Tort.* p. 26.  
*Malacoclemmys palustris*, *Agassiz*, *Contr. N. H. U. S.* i. p. 437, pl. i. figs. 10–12 (1857).  
*Clemmys terrapin*, *Strauch*, *Chelon. Stud.* p. 132 (1862), and *Verth. Schildkr.* p. 90 (1865).  
*Emys pileata*, *Wied*, *l. c.* p. 17, pl. i. figs. 2 & 3, & pl. ii. figs. 1–4.

Carapace much depressed, oval, posterior border sometimes distinctly reverted, very rarely serrated; a more or less strong, interrupted, vertebral keel or series of subconical tubercles; dorsal shields concentrically grooved, or smooth; nuchal moderate, as broad as long or a little broader than long; first vertebral broader anteriorly than posteriorly; vertebrals 2 to 4 much broader than long, broader than costals. Plastron a little smaller than the opening of the shell, obtusely angulated laterally; bridge rather narrow, its width considerably less than the length of the hind plastral lobe; latter openly notched posteriorly; relative proportions of the plastral shields very variable; the suture between the abdominals and that between the anals are of equal length, or the latter is the shorter; pectorals usually much smaller than abdominals, sometimes very slightly smaller; axillary and inguinal rather small. Head large; snout short, more or less obtusely pointed; upper beak

pendent, not hooked, forming an open notch mesially; alveolar surface of upper jaw narrowing towards the symphysis; the width of the mandible at the symphysis equals or a little exceeds the horizontal diameter of the orbit. Limbs stout, tubercular rather than scaly. The tail measures about two fifths the length of the carapace in the male, less in the female; a low dorsal crest of enlarged compressed scales on the postanal part of the tail. Carapace olive, with black concentric lines, or uniform blackish; plastron yellowish or reddish, blotched, speckled, or vermiculated with black, or with black concentric lines. Soft parts grey, spotted or vermiculated with black.

Length of shell 17 centim.

Salt-marshes of Atlantic coast of North America, from New York to Texas.

|                                    |             |                                       |
|------------------------------------|-------------|---------------------------------------|
| <i>a.</i> ♂, spir.                 | N. America. | Smithsonian Institution.              |
| <i>b, c.</i> ♂ ♀, spir.            | N. America. |                                       |
| <i>d, e, f.</i> Ad., stfid.        | N. America. | Gen. Hardwicke [P.].                  |
| <i>g.</i> Ad., stfid.              | N. America. | Lord Derby [P.].                      |
| <i>h, i, k.</i> Ad., skels.        | N. America. |                                       |
| <i>l.</i> Yg., shell.              | N. America. | (Type of var. <i>tuberculifera</i> .) |
| <i>m, n, o.</i> Ad. & hgr., shell. | N. America. |                                       |

## 2. *Malacoclemmys geographica*.

*Testudo geographica*, *Lesueur, Journ. Ac. Philad.* i. p. 86, pl. v. (1817); *Leconte, Ann. Lyc. N. Y.* iii. p. 108 (1830).

*Emys geographica*, *Say, Journ. Ac. Philad.* iv. p. 204 (1825); *Holbr. N. Am. Herp.* i. p. 99, pl. xiv. (1842); *Dekay, Faun. N. Y., Rept.* p. 18, pl. iv. fig. 7 (1842); *Gray, Cat. Tort.* p. 21 (1844), and *Sh. Rept.* i. p. 28 (1855).

*Terrapene geographica*, *Bonap. Osserv. s. sec. Ed. d. R. A.* p. 156 (1830).

*Emys geographica*, part., *Dum. & Bibr.* ii. p. 256 (1835).

—— *megacephala*, *Holbr. l. c.* p. 76; *Gray, Cat. Tort.* p. 21.

—— *labyrinthica*, *A. Dum. Cat. Méth. Rept.* p. 13 (1851).

*Graptemys geographica*, *Agassiz, Contr. N. II. U. S. i.* p. 436, pl. ii. figs. 7-9 (1857); *Gray, Suppl. Cat. Sh. Rept.* i. p. 45 (1870).

*Clemmys geographica*, *Strauch, Chelon. Stud.* p. 33 (1862), and *Verth. Schildkr.* p. 79 (1865).

*Malacoclemmys geographica*, *Cope, Check-List N. Am. Rept.* p. 53 (1875).

Carapace tectiform, the keel obtuse and not tubercular, widening posteriorly, the hind margin but moderately serrated, the posterior marginals not or but very indistinctly notched; nuchal usually longer than broad; vertebrals 2 to 4 much broader than long, as broad as or a little narrower than costals; shields smooth or feebly striated. Plastron obtusely angulated laterally; the length of the hind lobe but little greater than the width of the bridge; the longest median suture is that between the abdominal shields, which nearly equals that between humerals and pectorals; axillary and inguinal large. Head large; snout short and obtusely pointed; alveolar



surface still broader than in *M. terrapen*; the width of the mandible at the symphysis exceeds the horizontal diameter of the orbit. Limbs broadly webbed, scaly. Tail of male nearly half the length of the carapace. Olive above, reticulated with yellowish; plastron yellowish, uniform or with wavy dark lines. Head and neck dark olive or blackish, with numerous yellowish lines; a large triangular yellowish spot behind the eye, above the tympanum; limbs and tail streaked or marbled with black and yellowish.

Length of shell 22 centim.

Mississippi Valley to Pennsylvania and New York.

|                  |               |                          |
|------------------|---------------|--------------------------|
| a. Hgr. ♂, spir. | Pennsylvania. |                          |
| b. Hgr., skel.   | Louisiana.    |                          |
| c. Hgr., skel.   | N. America.   | Dr. J. E. Gray [P.].     |
| d. Ad., skel.    | N. America.   | Smithsonian Institution. |

### 3. *Malacoclemmys lesueurii*.

*Lesueur, Mém. Mus. Paris*, xv. p. 267 (1827).

*Emys lesueurii*, *Gray, Syn. Rept.* p. 31 (1831).

— *geographica*, part., *Dum. & Bibr.* ii. p. 256 (1835).

— *pseudogeographica*, *Holbr. N. Am. Herp.* i. p. 103, pl. xv. (1842);

*Dekay, Faun. N. Y., Rept.* p. 19, pl. ii. fig. 3 (1842); *A. Dum. Cat.*

*Méth. Rept.* p. 9 (1851); *Gray, Cat. Sh. Rept.* i. p. 29 (1855);

*Wied, N. Acta Ac. Leop.-Carol.* xxxii. i. p. 31 (1865).

*Graptemys lesueurii*, *Agass. Contr. N. H. U. S.* i. p. 436, pl. ii. figs. 10-12 (1857).

*Clemmys pseudogeographica*, *Strauch, Chelon. Stud.* p. 33 (1862), and *Verth. Schildkr.* p. 80 (1865).

*Graptemys pseudogeographica*, *Gray, Ann. & Mag. N. H.* (3) xii. p. 180 (1863), and *Suppl. Cat. Sh. Rept.* i. p. 45 (1870).

*Malacoclemmys pseudogeographicus*, *Cope, Check-List N. Am. Rept.* p. 53 (1875).

— *lesueuri*, *True, in Farrow, Check-List N. Am. Rept.* p. 34 (1882).

Allied to *M. geographica*, but vertebral keel stronger, ending in a tubercle on each shield; posterior border very strongly serrated, each marginal being notched; anterior border often openly emarginate. Head smaller. Carapace brown or olive, with yellowish reticulations; a large dark brown spot on each vertebral and costal shield; plastron yellowish, marbled with brown, or with broad dark vermiculate bands. Head and neck with yellow lines; a crescentic or angulated, broader, yellow transverse streak behind the eye.

Length of shell 24 centim.

Mississippi Valley to Wisconsin and Ohio.

|                                            |              |                          |
|--------------------------------------------|--------------|--------------------------|
| a, b, c, d, e, f. Ad., hgr., & yg., stfid. | Louisiana.   | W. P. Smith [C.].        |
| g. Hgr., spir.                             | Mississippi. |                          |
| h. Hgr., spir.                             | N. America.  | Smithsonian Institution. |
| i. Ad., stfid.                             | N. America.  | Dr. J. E. Gray [P.].     |
| k. Ad., stfid.                             | N. America.  |                          |
| l. Ad., shell.                             | N. America.  | Smithsonian Institution. |

## 9. DAMONIA.

*Emys*, part., *Dum. & Bibr.* ii. p. 232 (1835); *Gray, Cat. Tort.* p. 14 (1844); *Günth. Rept. Brit. Ind.* p. 21 (1864).

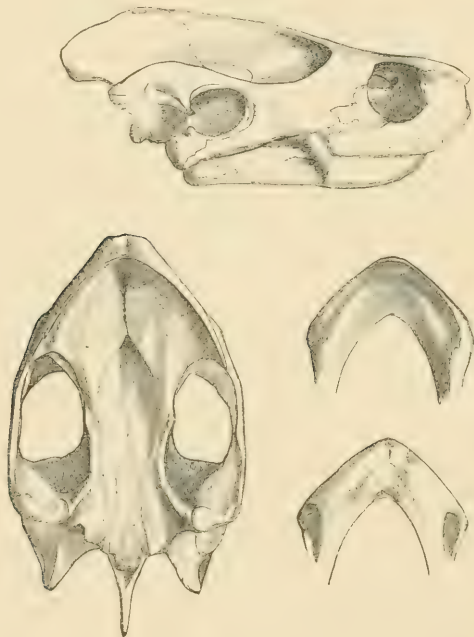
*Geoclemmys*, part., *Gray, Cat. Sh. Rept.* i. p. 17 (1855).

*Clemmys*, part., *Strauch, Chelon. Stud.* p. 28 (1862).

*Damonia*, *Gray, Proc. Zool. Soc.* 1869, p. 193, and *Suppl. Cat. Sh. Rept.* i. p. 42 (1870).

Neural plates hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with long axillary and

Fig. 26.



Skull of *Damonia subtrijuga*. (From Gray, P. Z. S. 1869.)

inguinal peduncles; the latter anchylosed between the fifth and sixth, exceptionally fourth and fifth costal plates; entoplastron intersected by the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces very broad, without median ridge; choanæ behind the level of the eyes. Skin of posterior part of head divided into small shields. Digits webbed. Tail short or moderate.

East Indies, China, Japan.

*Synopsis of the Species.*

## I. Carapace tricarinate.

## A. Axillary and inguinal shields present.

Keels interrupted, formed of a nodose prominence on each of the vertebral and costal shields ..... 1. *hamiltonii*, p. 93.

Keels continuous, the laterals not extending to the fourth costal shields ..... 2. *subtrijuga*, p. 94.

Keels continuous, the laterals extending to the fourth costal ..... 3. *reevesii*, p. 95.

B. Axillary shield absent, inguinal minute;  
lateral keels very feeble ..... 4. *mutica*, p. 96.

II. Carapace unicarinate ..... 5. *nigricans*, p. 97.1. *Damoniam hamiltonii*.

*Emys hamiltonii*, Gray, *Syn. Rept.* pp. 21, 72 (1831); *Dum. & Bibr.* ii. p. 315 (1835); Gray, *Cat. Tort.* p. 19 (1844); *Günth. Rept. Brit. Ind.* p. 32 (1864); *Anders. Proc. Zool. Soc.* 1876, p. 751.

— *picquotii*, Less. *Bull. Sc. Nat.* xxv. p. 120 (1831), and in *Bélang. Voy. Ind. Or., Zool.* p. 294 (1834).

— *guttata* (non Schn.), Gray, *Ill. Ind. Zool.* i. pl. lxxvi. fig. 1 (1832).

*Geoclemmys hamiltonii*, Gray, *Cat. Sh. Rept.* i. p. 17 (1855).

*Clemmys hamiltonii*, Strauch, *Chelon. Stud.* p. 32 (1862).

*Damoniam hamiltonii*, Gray, *Proc. Zool. Soc.* 1869, p. 195, and *Suppl. Cat. Sh. Rept.* i. p. 43 (1870); *Theob. Cat. Rept. Brit. Ind.* p. 11 (1876).

*Melanochelys pictus*, Murray, *Ann. & Mag. N. H.* (5) xiv. p. 107 (1884).

*Clemmys palaeindica*, Lydekker, *Pal. Ind.* (10) iii. p. 178, pl. xxi. figs. 1 & 3 (1885).

Carapace much elevated, with three interrupted keels or series of nodose prominences corresponding with the vertebral and costal shields; posterior border strongly serrated in the young, feebly in the adult; nuchal moderate, broader posteriorly than anteriorly; first vertebral not or scarcely broader anteriorly than posteriorly; second and third vertebrals broader than long in the young, nearly as long as broad in the adult, narrower than the costals. Plastron large, angulated laterally, truncate anteriorly; posterior lobe much narrower than the opening of the shell, nearly as long as the width of the bridge, deeply notched posteriorly; the longest median sutures are those between the abdominals and between the humerals, the shortest those between the humerals and between the anals. Head rather large; snout very short, not projecting; upper jaw emarginate mesially; the width of the mandible at the symphysis nearly equals the horizontal diameter of the orbit; a large shield, sometimes divided into three, covers the upper surface

of the snout and the crown; one round the upper jaw and one on each side between the eye and the ear. Digits webbed to the claws. Tail extremely short. Shell dark brown or blackish, elegantly marked with yellow spots and radiating streaks. Soft parts dark brown or blackish, with round yellow spots, largest on the head and neck.

Length of shell 22 centim.

Bengal, Punjab, Upper Sind. Fossil in the Siwaliks of the Punjab.

|                        |         |                         |
|------------------------|---------|-------------------------|
| a. Yg., stffid.        | India.  | (Type.)                 |
| b. Ad., shell & skull. | Bengal. | R. Lydekker, Esq. [E.]. |
| c-d. Yg., spir.        | — ?     | Zoological Society.     |
| e. Yg., skel.          | — ?     |                         |
| f. Yg., shell & skull. | — ?     |                         |

## 2. *Damonia subtrijuga*.

*Emys trijuga* (*non Schweigg.*), *Schleg. Faun. Japon.*, Rept. p. 64 (1833).

— *subtrijuga*, *Schleg. & Müll. in Temminck, Verh. Naturk. Nederl. Ind.* p. 30 (1844); *Hubrecht, Notes Leyd. Mus.* iii. p. 48 (1881).

*Geoclemmys macrocephala*, *Gray, Proc. Zool. Soc.* 1859, p. 479, pl. xxi., and 1861, p. 139.

*Clemmys macrocephala*, *Strauch, Chelon. Stud.* p. 32 (1862).

*Emys nuchalis*, *Blyth, Journ. As. Soc. Beng.* xxxii. p. 82 (1863).

— *macrocephala* (*non Gray*, 1844), *Günth. Rept. Brit. Ind.* p. 31 (1864).

*Damonia macrocephala*, *Gray, Proc. Zool. Soc.* 1869, p. 194, and *Suppl. Cat. Sh. Rept.* i. p. 43 (1870).

*Bellia nuchalis*, *Gray, Suppl.* p. 41.

*Damonia oblonga*, *Gray, Ann. & Mag. N. H.* (4) viii. 1871, p. 367, and xi. 1873, p. 299.

Carapace depressed, tricarinate, the lateral keels not extending to the fourth costal shields; posterior border not serrated; nuchal moderate, broadest behind; vertebrals 2 to 4 a little broader than long, much narrower than the costals. Plastron smaller than the opening of the shell, flat in both sexes, angulated laterally, truncate anteriorly, angularly notched posteriorly; the width of the bridge nearly equals the length of the hind lobe; the abdominal shields form the longest median suture; the suture between the gulars as long as or shorter than that between the humerals; axillary and inguinal present. Head very large; snout projecting; upper jaw emarginate mesially; the width of the mandible at the symphysis exceeds the horizontal diameter of the orbit; four large shields on the head—one round the upper jaw, another covering the snout and the crown, and one on each side between the eye and the ear. Digits webbed to the claws. Tail extremely short. Shell brown above, with a more or less distinct black spot on each shield; plastron yellow, each shield with a large black blotch. Soft parts dark brown; a yellow streak from the end of the snout to the temple, following the canthus rostralis and the supraorbital edge; another

from the loreal region to the angle of the mouth; two or four vertical yellow streaks below the nostrils; a V- or Y-shaped yellow marking on each side of the mandible; sides of neck with yellow streaks.

Length of shell 20 centim.

Siam, Camboja, Java.

|                              |          |                                                          |
|------------------------------|----------|----------------------------------------------------------|
| <i>a, b.</i> Hgr., stfdd.    | Siam.    | M. Mouhot [C.]. (Types of <i>G. macrocephala</i> .)      |
| <i>c.</i> Yg., dry.          | Siam.    | M. Mouhot [C.].                                          |
| <i>d.</i> Yg., shell.        | Siam.    | M. Mouhot [C.].                                          |
| <i>e.</i> Yg., spir.         | Siam.    | W. H. Newman, Esq. [P.].                                 |
| <i>f, g.</i> ♀ & yg., stfdd. | Camboja. | M. Mouhot [C.].                                          |
| <i>h.</i> Yg., shell.        | Camboja. |                                                          |
| <i>i.</i> ♂, stfdd.          | Batavia. | (Type of <i>D. oblonga</i> .)                            |
| <i>k.</i> Yg., spir.         | Batavia. | Dr. Bleeker. (As <i>Cistudo gibbosa</i> .)               |
| <i>l.</i> Yg., spir.         | — ?      |                                                          |
| <i>m.</i> ♀, skel.*          | — ?      | (Specimen mentioned by Gray as <i>Emys subtrijuga</i> .) |
| <i>n, o.</i> ♀ & hgr., skel. | — ?      |                                                          |

### 3. *Damonia reevesii*.

*Emys reevesii*, Gray, *Syn. Rept.* p. 73 (1831); *Dum. & Bibr.* ii. p. 313 (1835); *Gray, Cat. Tort.* p. 18 (1844); *Günth. Rept. Brit. Ind.* p. 29 (1864); *Rütimeyer, Verh. Naturf. Ges. Basel*, vi. p. 48 (1873).

— *vulgaris picta*, Schleg. *Abbild.* p. 127, pl. xlii. (1844).

— *japonica*, A. Dum. *Cat. Méth. Rept.* p. 8 (1851), and *Arch. Mus.* vi. p. 220 (1852).

*Geoclemmys reevesii*, Gray, *Cat. Sh. Rept.* i. p. 18, pl. v. (1855).

*Clemmys reevesii*, Strauch, *Chelon. Stud.* p. 104 (1862).

*Damonia reevesii*, Gray, *Proc. Zool. Soc.* 1869, p. 194, and *Suppl. Cat. Sh. Rept.* i. p. 44 (1870), and *Ann. & Mag. N. II.* (4) xi. p. 148 (1873).

Carapace depressed, tricarinate, posterior border not serrated; nuchal small, posterior border usually notched; vertebrals 2 to 4 broader than long, a little narrower than the costals. Plastron large, flat in both sexes, angulated laterally, posterior lobe narrower than the opening of the shell (especially in the male), nearly as long as the bridge is wide, deeply notched posteriorly; the abdominal shields form the longest median suture; the suture between the gulars longer than that between the humerals; axillary and inguinal shields present. Head rather large; snout projecting; upper jaw scarcely emarginate mesially; the width of the mandible at the symphysis is a little less than the horizontal diameter of the orbit; four large shields on the head—one round the upper jaw, one covering the snout and the crown, and one on each side between the eye and the ear. Digits webbed to the claws. Tail one third to half the length of the shell. Carapace brown; plastron yellowish, each shield with a large dark brown blotch, or dark brown with the

\* The skull attached to this specimen belongs to *Nicoria trijuga*!



sutures yellowish. Soft parts olive; sides of head with more or less distinct yellowish curved lines; two or three yellowish streaks along each side of the neck; throat and lower surface of neck spotted with yellowish.

Length of shell  $12\frac{1}{2}$  centim.

China, Japan.

|                                              |                                  |                            |            |
|----------------------------------------------|----------------------------------|----------------------------|------------|
| a. Hgr., stffd.                              | China.                           | J. Reeves, Esq. [P.].      | } (Types.) |
| b. Hgr., shell.                              | China.                           | J. Reeves, Esq. [P.].      |            |
| c. ♀, spir.                                  | China.                           |                            |            |
| d. ♀, stffd.                                 | Shanghai.                        | R. Swinhoe, Esq. [C.].     |            |
| e-f. ♂ ♀, spir.                              | Shanghai.                        | R. Swinhoe, Esq. [C.].     |            |
| g. Yg., spir. (with con-<br>fervoid growth). | Kiu-Kiang.                       | Dr. W. Lockart [P.].       |            |
| h. Yg., spir. (with con-<br>fervoid growth). | Kiu-Kiang.                       | Mr. F. W. Styan [C.].      |            |
| i-l. ♀ & yg., spir.                          | Mountains north<br>of Kiu-Kiang. | Mr. Pratt [C.].            |            |
| m. Yg., spir. (with con-<br>fervoid growth). | Chi-Tsen.                        | J. Walley, Esq. [P.].      |            |
| n. ♀, spir.                                  | Foo-Choo.                        | St. Petersburg Mus. [E.].  |            |
| o. ♀, spir.                                  | Japan.                           | Capt. H. C. St. John [P.]. |            |
| p. ♂, shell.                                 | Japan.                           | A. Adams, Esq. [C.].       |            |
| q. Hgr., stffd.                              | — ?                              |                            |            |
| r. ♂, skel.                                  | — ?                              |                            |            |

#### Var. unicolor.

*Damonia unicolor*, Gray, *Ann. & Mag. N. H.* (4) xii. p. 78 (1873).

*Clemmys unicolor*, Slater, *Proc. Zool. Soc.* 1873, p. 517, pl. xlv.

Uniform black.

|              |           |                        |            |
|--------------|-----------|------------------------|------------|
| a-b. ♂, spir | Shanghai. | R. Swinhoe, Esq. [C.]. | } (Types.) |
| c. ♂, stffd. | Shanghai. | R. Swinhoe, Esq. [C.]. |            |
| d. ♂, skel.  | Shanghai. | R. Swinhoe, Esq. [C.]. |            |

#### 4. *Damonia mutica*.

*Emys mutica*, Cantor, *Ann. & Mag. N. H.* ix. p. 482 (1842);  
*Günth. Rept. Brit. Ind.* p. 25 (1864).

— *nigricans*, part., Gray, *Cat. Sh. Rept.* i. p. 20, pl. xv. fig. 2 (1855).

*Damonia nigricans*, part., Gray, *Suppl. Cat. Sh. Rept.* i. p. 44 (1870).

Carapace moderately depressed, tricarinate, the vertebral ridge strong, the laterals very feeble; nuchal small; vertebrals broader than long, a little narrower than the costals. Front and hind lobes narrowed, former truncate, latter deeply notched; sides obtusely angulated; the width of the bridge equals the length of the hind lobe; the abdominal shields form the longest median suture, the gulars the shortest; no axillary shield, inguinal minute. Carapace brown; plastron yellowish, each shield with a large black blotch.

Length  $7\frac{1}{2}$  centim.

Southern China.

|                 |         |                     |
|-----------------|---------|---------------------|
| a. Hgr., shell. | Canton. | Dr. Cantor. (Type.) |
|-----------------|---------|---------------------|

5. *Damonia nigricans*.

*Emys nigricans*, *Gray, Proc. Zool. Soc.* 1834, p. 53, and *Cat. Tort.* p. 18 (1844); *Günth. Rept. Brit. Ind.* p. 26 (1864).

— *nigricans*, part., *Gray, Cat. Sh. Rept.* i. p. 20, pl. vi. (1855).

*Clemmys nigricans*, *Strauch, Chelon. Stud.* p. 32 (1862).

*Damonia nigricans*, part., *Gray, Proc. Zool. Soc.* 1869, p. 195, and *Suppl. Cat. Sh. Rept.* i. p. 44 (1870).

Carapace tectiform, unicarinate, posterior border not serrated; nuchal very small or absent; vertebral shields broader than long, a little narrower than costals. Plastron not angulated laterally, flat in the male; hind lobe narrower than the opening of the shell, nearly as long as the bridge is wide, deeply notched posteriorly; the abdominal shields form the longest median suture, the humerals the shortest; axillary and inguinal shields well developed. Head rather small; snout projecting; upper jaw scarcely notched mesially. Digits webbed to the claws. Tail about two thirds the length of the shell. Carapace dark brown; plastron yellow, black-spotted, bridge black; marginals inferiorly half black, half yellow, the two colours forming a festooned pattern. Head and limbs blackish; sides of head and neck with interrupted yellow streaks; throat yellow, varied with black.

Length of shell 11 centim.

Southern China.

a. ♀, shell.

b. ♂, stffid.

China.

— ?

J. Reeves, Esq. [P.] (Type.)  
Zoological Society.

10. *BELLIA*.

*Emys*, part., *Dum. & Bibr.* ii. p. 232 (1835); *Gray, Cat. Tort.* p. 14 (1844), and *Sh. Rept.* i. p. 19 (1855); *Günth. Rept. Brit. Ind.* p. 21 (1864).

*Clemmys*, part., *Strauch, Chelon. Stud.* p. 28 (1862).

*Bellia*, *Gray, Proc. Zool. Soc.* 1869, p. 197, and *Suppl. Cat. Sh. Rept.* i. p. 34 (1870).

*Orlitia*, *Gray, Ann. & Mag. N. H.* (4) xi. p. 156 (1873).

*Heteroclemmys*, *Peters, Mon. Berl. Ac.* 1874, p. 622.

Neural plates hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with long axillary and inguinal buttresses, the latter anchylosed between the fifth and sixth costal plates; entoplastron intersected by the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces without median ridge; choanæ between the eyes. Skin of hinder part of head divided into small shields. Digits webbed. Tail very short, not longer in the young than in the adult.

Burma, Siam, Malay Peninsula and Archipelago.

1. *Bellia crassicollis*.

*Emys crassicollis*, *Gray, Syn. Rept.* p. 21 (1831), and *Ill. Ind. Zool.* i. pl. lxxvi. fig. 2 (1832); *Dum. & Bibr.* ii. p. 325 (1835); *Gray, Cat. Tort.* p. 16 (1844); *Cantor, Cat. Mal. Rept.* p. 3 (1847); *Gray, Cat. Sh. Rept.* i. p. 20 (1855); *Günth, Rept. Brit. Ind.* p. 28, pl. iv. fig. E (1864).

— *spengleri*, part., *Schleg. Faun. Japon., Rept.* p. 49 (1833).

— *nigra*, *Blyth, Journ. As. Soc. Beng.* xxiv. 1855, p. 713 (1856), and xxxii. 1863, p. 81.

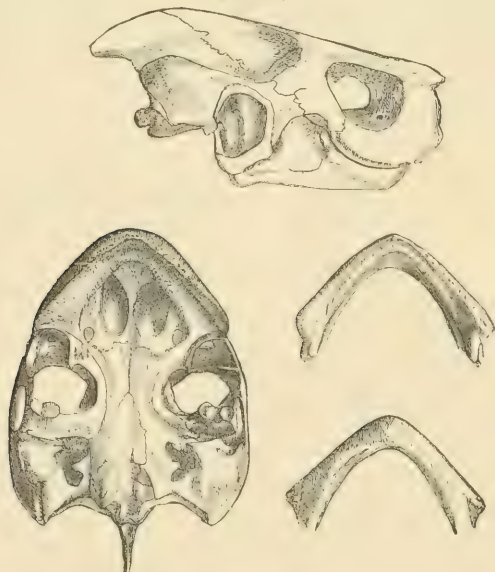
*Clemmys crassicollis*, *Strauch, Chelon. Stud.* p. 32 (1862), and *Verth. Schildkr.* p. 69 (1865).

*Bellia crassicollis*, *Gray, Proc. Zool. Soc.* 1869, p. 197, and *Suppl. Cat. Sh. Rept.* i. p. 40 (1870).

— *crassilabris*, *Theob. Cat. Rept. Brit. Ind.* p. 10 (1876).

Carapace moderately depressed, tricarinate in the young, the keels, especially the laterals, becoming indistinct in old specimens; vertebral region flattened in the adult male; posterior border serrated; nuchal small, broadest behind; posterior side of first

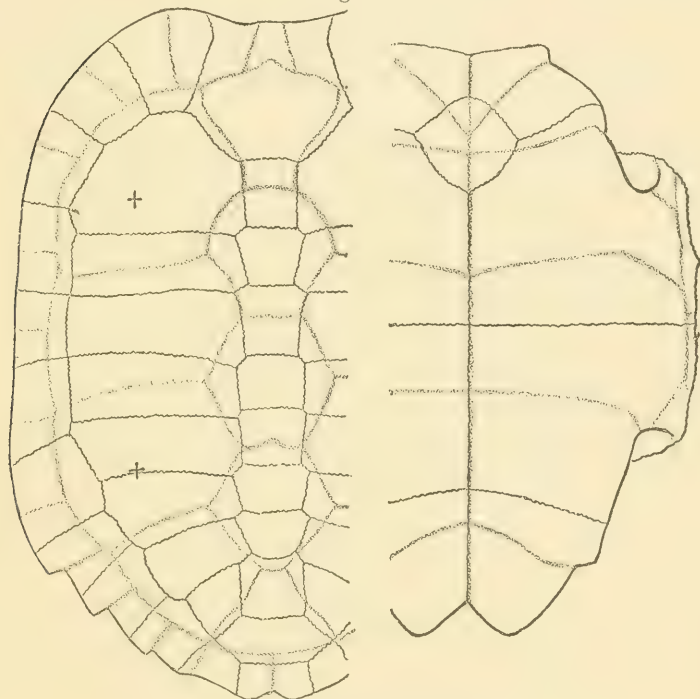
Fig. 27.

Skull of *Bellia crassicollis*. (From Gray, P. Z. S. 1869.)

vertebral not half the length of the shield in the adult; vertebrals 2 to 4 as long as broad or a little broader than long, much narrower than the costals, narrowly in contact with each other in old specimens; in the latter the antero-lateral sides are convex, the postero-lateral longer and concave. Plastron smaller than the opening of the shell, truncate anteriorly, angularly notched posteriorly, feebly concave in the males, strongly angulated laterally in young specimens, feebly in old ones; the width of the bridge about equals the length of the hind lobe; relative size of plastral shields very variable; abdominals usually forming the longest

median suture, humerals the shortest; axillary and inguinal shields present. Head rather large, snout very short, not prominent; upper jaw strongly curved on each side, not hooked; the width of the mandible at the symphysis is a little less than the diameter of the orbit. Digits webbed to the claws; front of forearm and outer side of leg with large transverse band-like scales. Shell dark

Fig. 28.

Shell of *Bellia crassicollis*.

brown or black, plastron usually with yellowish variegations, or bands following the sutures of the shields, or a broad band along each side. Soft parts dark brown or black; some large yellow spots on the head, viz. above the eye, above the ear, below the ear, and on each side of the mandible; these spots become indistinct in old specimens.

Length of shell 17 centim.

Tenasserim, Siam, Malay Peninsula, Sumatra.

|                             |                  |                            |
|-----------------------------|------------------|----------------------------|
| <i>a, b, c.</i> ♂ ♀ & hgr., | Mergui.          | Prof. Oldham [P.]          |
| shells.                     |                  |                            |
| <i>d, e.</i> Skulls.        | Mergui.          | Prof. Oldham [P.]          |
| <i>f.</i> ♀, shell.         | Tenasserim ?     | W. Theobald, Esq. [C.]     |
| <i>g.</i> Hgr., stfid.      | Siam.            | M. Mouhot [C.]             |
| <i>h.</i> ♀, stfid.         | Malay Peninsula. | Dr. Cantor.                |
| <i>i.</i> Hgr., shell.      | Sumatra.         | T. Bell, Esq. [P.] (Type.) |

|                                   |          |                           |
|-----------------------------------|----------|---------------------------|
| <i>k.</i> Hgr., spir.             | Sumatra. | Leyden Museum.            |
| <i>l.</i> Yg., spir.              | Sumatra. |                           |
| <i>m, n.</i> Hgr. & yg.,<br>spir. | Borneo.  | L. L. Dillwyn, Esq. [P.]. |
| <i>o.</i> Hgr., skel.             | Borneo.  | L. L. Dillwyn, Esq. [P.]. |
| <i>p, q.</i> ♂, stfifd.           | —?       |                           |
| <i>r.</i> ♀, spir.                | —?       |                           |
| <i>s.</i> Hgr., stfifd.           | —?       |                           |

## 2. *Bellia borneensis*.

*Orlitia borneensis*, *Gray, Ann. & Mag. N. H.* (4) xi. p. 157 (1873).

*Clemmys* (*Heteroclemmys*) *gibbera*, *Peters, Mon. Berl. Ac.* 1874, p. 622, pl. ii.

Carapace very convex, tectiform, with a single obtuse keel, distinct only posteriorly; posterior border serrated, the posterior marginals very much smaller than the others; shields slightly rugose; nuchal rather large, a little broader than long; vertebrals broader than long, narrower than the costals, second and third hexagonal equilateral; fourth costal not half as large as third. Plastron smaller than the opening of the shell, truncate anteriorly, angularly notched posteriorly, strongly angulated laterally; the width of the bridge much exceeds the length of the hind lobe; pectoral, abdominal, and femoral shields equal in length; the shortest median sutures formed by the anal and humeral shields; axillary and inguinal shields present. Head as in *B. crassicollis*. Digital webs very much developed. Uniform brown.

Length of shell 8 centim.

Borneo.

|                             |          |                                                         |
|-----------------------------|----------|---------------------------------------------------------|
| <i>a.</i> Hgr. (?), stfifd. | Sistang. | Dr. Bleeker. (Type.— <i>Cistudo borneensis</i> , Blkr.) |
|-----------------------------|----------|---------------------------------------------------------|

## 11. CLEMMYS.

*Emys*, part., *Dumér. Zool. Anal.* p. 76 (1806); *Dum. & Bibr.* ii. p. 252 (1835); *Gray, Cat. Tort.* p. 14 (1844), and *Cat. Sh. Rept.* i. p. 19 (1855).

*Chersine*, part., *Merrem, Tent.* p. 29 (1820).

*Clemmys*, part., *Wagler, Syst. Amph.* p. 136 (1830); *Strauch, Chelon. Stud.* p. 28 (1862).

*Terrapene* (*non Merr.*), part., *Bonap. Osserv. s. sec. Ed. d. R. A.* p. 153 (1830).

*Chelopus, Rafin. Atlant. Journ.* p. 64 (1832).

*Geoclemys*, part., *Gray, Cat. Sh. Rept.* i. p. 17 (1855), and *Suppl.* p. 26 (1870).

*Nanemys, Agassiz, Contr. N. H. U. S. i.* p. 442 (1857).

*Calemys, Agassiz, l. c.* p. 443.

*Glyptemys, Agassiz, l. c.*; *Gray, Suppl.* p. 28.

*Actinemys, Agassiz, l. c.* p. 444.

*Chelopus*, part., *Cope, Proc. Ac. Philad.* 1865, p. 185.

*Mauremys, Gray, Proc. Zool. Soc.* 1869, p. 499, and *Suppl. Cat. Sh. Rept.* p. 34.

*Sacalia, Gray, Suppl.* p. 35.

*Emys, Gray, l. c.* p. 36.

*Emmenia, Gray, l. c.* p. 38.

*Eryma, Gray, l. c.* p. 44



Neural plates hexagonal, short-sided in front. Plastron extensively united to the carapace by suture, with short axillary and inguinal buttresses, just reaching the first and fifth costals respectively; entoplastron intersected by the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces without median ridge; choanae between the eyes. Upper surface of head covered with undivided skin. Digits more or less distinctly webbed. Tail moderate in the adult, long in the young.

South Europe, North-west Africa, South-western Asia, China, Japan, North America.

Fig. 29.



Skull of *Clemmys insculpta*. (From Gray, P. Z. S. 1869.)

*Synopsis of the Species.*

- I. The median suture between the anal shields shorter than that between the femorals.

|                                                       |                              |
|-------------------------------------------------------|------------------------------|
| Upper jaw notched mesially, finely denticulated ..... | 1. <i>caspica</i> , p. 103.  |
| Upper jaw notched mesially, not denticulated .....    | 2. <i>leprosa</i> , p. 105.  |
| Upper jaw not notched .....                           | 3. <i>japonica</i> , p. 106. |
|                                                       | 12                           |

II. The median suture between the anals longer than that between the femorals.

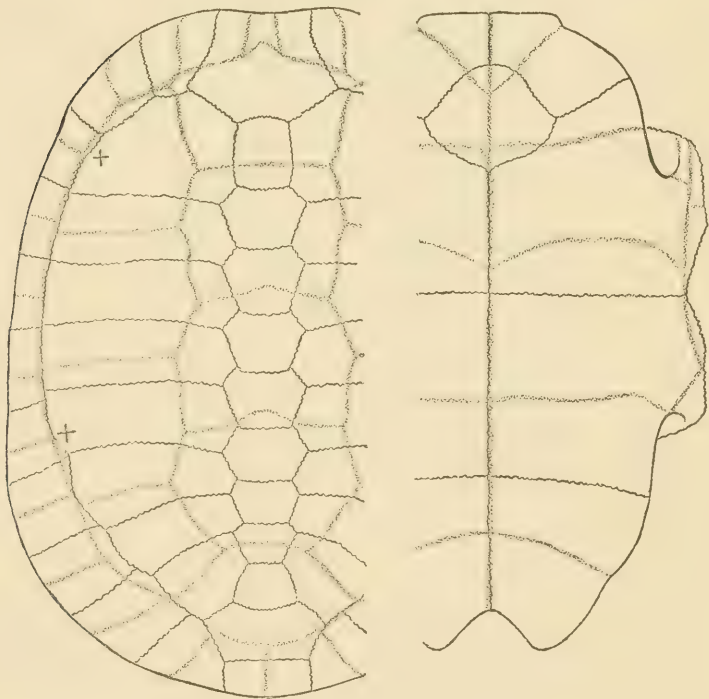
A. The length of the median suture between the femoral and anal shields nearly equals the width of the bridge.

1. Digits webbed to the claws; upper jaw not notched ..... 4. *bealii*, p. 107.
2. Digits webbed at the base; upper jaw notched in the middle, with a cusp on each side.

Posterior border of carapace serrated .... 5. *insculpta*, p. 107.

Posterior border of carapace not serrated. 6. *muhlenbergii*, p. 108.

Fig. 30.



Shell of *Clemmys leprosa*.

B. The length of the median suture between the femoral and anal shields exceeds the width of the bridge; upper jaw simply notched in the middle.

Digits feebly webbed ..... 7. *guttata*, p. 109.

Digits webbed to the claws ..... 8. *marmorata*, p. 110.

1. *Clemmys caspica*.

*Testudo caspica*, *Gmelin, Reise d. Russl.* iii. p. 59, pls. x. & xi. (1774); *Schneid. Schildkr.* p. 344 (1783); *Daud. Rept.* ii. p. 124 (1802).

— *græca* (non *L.*), *Pall. Zoogr. Ross.-As.* iii. p. 17 (1811).

*Emys caspica*, *Schweigg. Prodr.* p. 37 (1814); *Eichw. Zool. Spec.* iii. p. 196 (1831); *Dum. & Bibr.* ii. p. 255 (1835).

*Clemmys caspica*, *Wagler, Icon. Amph.* (1830); *Eichw. Faun. Casp.-Cauc.* p. 45, pls. iii. & iv. (1841); *Strauch, Chelon. Stud.* p. 117 (1862); *Blanf. Zool. E. Persia*, p. 309 (1876).

*Emys grayi*, *Günth. Proc. Zool. Soc.* 1869, p. 504, pl. xxxviii.

*Emmenia grayi*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 38 (1870).

Carapace rather strongly depressed, with an obtuse vertebral keel and a more or less distinct costal keel in the young; in the half-grown, the lateral keels disappear, but a trace of the vertebral keel usually remains, even in old specimens; posterior margin not at all serrated; vertebral shields broader than long, nearly as broad as the costals; nuchal of moderate size. Plastron large, flat or convex in the female, very slightly concave in the male; truncate anteriorly, angularly notched posteriorly; the width of the bridge a little less than the length of the hind lobe; the longest median sutures formed by the abdominal and femoral shields, which are either equal or the former is the longer; axillary and inguinal shields well developed, latter largest. Head moderate; upper jaw not hooked, notched in the middle; the width of the mandible at the symphysis is less than the horizontal diameter of the orbit; edge of jaws finely denticulated in the halfgrown and adult. Digits webbed to the claws. Tail about three fifths the length of the carapace in the young, half in the males, two fifths or one third in the females. Carapace olive or olive-brown above, with elegant curved yellowish streaks, which form a more or less regular  on each costal shield and a ring on each marginal; these markings most distinct in the young, especially after removal of the epidermic shields; lower surface of marginals constantly yellow, with the sutures black, and two oval black spots on marginals 3 to 7. Plastron yellow, with large black spots, which nearly cover the whole surface in the young, the border and the bridge remaining, however, constantly yellow, with black sutures. Head olive; a yellow line on the canthus rostralis and supraorbital border, two or three on each side of the snout, and four on each temple; no ocelli; neck with numerous yellow, finely black-edged streaks, three of which, along the nape, are broadest and extend to the occiput. Soft parts streaked and handsomely marbled with dark olive on a yellow ground.

Length of shell 18 centim.

Southern borders of Caspian Sea to Persian Gulf.



2. *Clemmys leprosa*.

- Emys leprosa*, *Schweigg. Prodr.* p. 29 (1814); *Strauch, Erp. Alg.* p. 18 (1862).  
 ? *Emys marmorea*, *Spix, Test. Bras.* p. 13, pl. x. (1824); *Dum. & Bibr.* ii. p. 248 (1835).  
*Clemmys sigriz*, *Michx. Isis*, 1829, p. 1295.  
*Emys vulgaris*, *Gray, Syn. Rept.* p. 24, pl. iv. (1831).  
*Terrapene sigriz*, *Bonap. Saggio Distr. Metod.* p. 29 (1832).  
*Emys lutaria* (*non L.*), *Bell, Mon. Test.* pls. xxxi. & xxxii. (1835).  
 — *sigriz*, *Dum. & Bibr.* ii. p. 240 (1835); *Eichw. Nouv. Mém. Soc. Nat. Mosc.* (2) ix. p. 415 (1854); *Lortet, Arch. Mus. Lyon*, iv. p. 19, pl. vii. (1887).  
 — *caspica*, part., *Gray, Cat. Tort.* p. 19 (1844), and *Sh. Rept.* i. p. 22 (1855); *Schreib. Herp. Eur.* p. 528 (1875).  
 — *laticeps*, *Gray, Proc. Zool. Soc.* 1852, p. 134 (1853), and *Cat. Sh. Rept.* i. p. 23, pl. ix.  
 — *fuliginosa*, *Gray, Proc. Zool. Soc.* 1860, p. 223, pl. xxx.  
*Clemmys marmorea*, *Strauch, Chelon. Stud.* p. 32 (1862).  
 — *laticeps*, *Strauch, l. c.*  
 — *leprosa*, *Strauch, l. c.* p. 122, and *Verth. Schildkr.* p. 74 (1865).  
*Mauremys laniaria*, *Gray, Proc. Zool. Soc.* 1869, p. 499, pl. xxxvii.  
 — *fuliginosa*, *Gray, l. c.* p. 500, and *Suppl. Cat. Sh. Rept.* i. p. 35 (1870).  
*Emys flavipes*, *Gray, ll. cc.* p. 643, pl. 1., and p. 37; *Sclater, Proc. Zool. Soc.* 1872, p. 603.  
 — *fraseri*, *Gray, ll. cc.* p. 643, and p. 36, and *Ann. & Mag. N. H.* (4) xi. p. 146 (1873).  
 — *laniaria*, *Gray, Suppl. Cat. Sh. Rept.* p. 37.  
*Eryma laticeps*, *Gray, l. c.* p. 45.  
*Emys caspia*, var. *leprosa*, *Boettg. Abh. Senck. Ges.* ix. p. 126 (1874).  
*Clemmys caspia sigriz*, *Bedriaga, Bull. Soc. Nat. Mosc.* lvi. p. 340 (1882).

Very closely allied to *C. caspica*, but unquestionably a distinct species. Head larger, the difference conspicuous in halfgrown as well as adult specimens; in old specimens the head becomes very massive, short and broad, with very strong jaws with broad alveolar surfaces, the width of the mandible at the symphysis nearly equalling the horizontal diameter of the orbit; edge of jaws never denticulated. Lateral dorsal keels distinct in newly-born specimens only. Carapace dark olive in the young, with an oval orange spot or short longitudinal streak on each shield; uniform pale olive in the adult. Plastron dark brown in the young, with a yellowish border, yellowish or pale olive in the adult. Head olive; sides with orange or yellow streaks or vermiculations, and a round orange spot between the eye and the ear and a more or less defined ring of the same colour round the latter; neck with orange or yellow streaks, three or four on each side; limbs streaked olive and yellow or orange, either the one or the other colour predominating; these bright markings become very indistinct in old specimens.

Length of shell 20 centim.

South of Spain and Portugal, Morocco, Algeria, Tunis, Senegambia.



|                                      |                                   |                                                     |
|--------------------------------------|-----------------------------------|-----------------------------------------------------|
| <i>a.</i> Yg., spir.                 | Minas de S. Domingo,<br>Alentejo. | Dr. Gadow [C.].                                     |
| <i>b, c.</i> Yg., skel.              | Santa Marta (Murcia?).            | Dr. J. E. Gray [P.].                                |
| <i>d.</i> Hgr., shell.               | Europe.                           | T. Bell, Esq. [P.].                                 |
| <i>e-f.</i> Yg., spir.               | N. Africa.                        | Mr. Fraser [C.]. (Types of<br><i>E. fraseri.</i> )  |
| <i>g-h.</i> Yg., spir.               | Tangiers.                         | M. H. Vaucher [C.].                                 |
| <i>i-k.</i> ♀, spir.                 | Morocco.                          | Zoological Society.                                 |
| <i>l, m.</i> ♂ ♀, stffd.             | Algeria.                          |                                                     |
| <i>n.</i> Yg., spir.                 | Algeria.                          | E. Doubleday, Esq. [P.].                            |
| <i>o-s.</i> ♂ ♀, stffd.              | Gambia.                           | (Types of <i>E. laticeps.</i> )                     |
| <i>t-u.</i> Hgr., spir.              | —?                                | Zoological Soc. (Types of<br><i>E. laniaria.</i> )  |
| <i>v, w, x.</i> Hgr. & yg.,<br>spir. | —?                                | Zoological Soc. (Types of<br><i>E. flavipes.</i> )  |
| <i>y.</i> Hgr., stffd.               | —?                                | Zoological Soc. (Type of<br><i>E. fuliginosa.</i> ) |
| <i>z, a.</i> ♀, skel.                | —?                                | Zoological Soc.                                     |
| <i>β.</i> ♀, stffd.                  | —?                                | Dr. J. E. Gray [P.].                                |
| <i>γ.</i> ♀, spir.                   | —?                                | Lord A. Russell [P.].                               |

### 3. *Clemmys japonica.*

*Emys vulgaris japonica*, *Schleg. Faun. Japon., Rept.* p. 53, pls. viii., ix. (1838), and *Abbild.* p. 126, pl. xli. (1844).

— *japonica*, *Gray, Cat. Tort.* p. 19 (1844); *Gray, Cat. Sh. Rept.* i. p. 22 (1855), and *Suppl.* p. 36 (1870).

— *caspica*, var. *japonica*, *A. Dum. Cat. Méth. Rept.* p. 8 (1851), and *Arch. Mus.* vi. p. 219 (1852).

*Clemmys japonica*, *Strauch, Chelon. Stud.* p. 32 (1862).

Carapace rather strongly depressed, with an obtuse keel; posterior margin serrated; each posterior marginal, in the young, biuspid; vertebral shields much broader than long, nearly as broad as the costals in the adult; nuchal of moderate size. Plastron large, scarcely concave in the male, truncate or openly emarginate anteriorly, angularly notched posteriorly; the width of the bridge equals the length of the hind lobe; the longest median suture is that between the abdominal shields, the shortest that between the humerals; axillary and inguinal shields well developed, latter largest. Head rather small; upper jaw neither hooked nor notched; the width of the mandible at the symphysis is less than the horizontal diameter of the orbit. Digits webbed to the claws. Tail about as long as the carapace in the young, half as long in the adult. Shell dark brown above, black inferiorly; in the young the anterior and posterior plastral lobes narrowly margined with yellowish; soft parts olive-brown or blackish; a pale brown streak along the outer border of the limbs and a broad pale brown band along the upper surface of the tail.

Length of shell 14 centim.

Japan.

|                             |           |                      |
|-----------------------------|-----------|----------------------|
| <i>a-b.</i> ♂ & hgr., spir. | Japan.    | Leyden Museum.       |
| <i>c.</i> Hgr., spir.       | Japan.    |                      |
| <i>d.</i> Yg., spir.        | Kobe.     | H.M.S. 'Challenger.' |
| <i>e-h.</i> Yg., spir.      | Yokohama. | H.M.S. 'Challenger.' |

4. *Clemmys bealii*.

- Cistuda bealii*, Gray, *Syn. Rept.* p. 71 (1831).  
*Emys bealii*, Gray, *Proc. Zool. Soc.* 1834, p. 54; *Dum. & Bibr.* ii. p. 323 (1835); Gray, *Cat. Tort.* p. 17 (1844), and *Cat. Sh. Rept.* i. p. 21, pl. viii. (1855); *Günth. Rept. Brit. Ind.* p. 23 (1864).  
*Clemmys bealii*, Strauch, *Chelon. Stud.* p. 32 (1862).  
*Sacalia bealii*, Gray, *Suppl. Cat. Sh. Rept.* i. p. 35 (1870).

Carapace moderately depressed, obtusely keeled behind, rather elongate, smooth; posterior margin not serrated; vertebral shields much broader than long, as broad as the costals; nuchal narrow. Plastron large, truncate anteriorly, openly emarginate posteriorly; the width of the bridge equals the length of the hind lobe; abdominal shields much larger than the pectorals; the longest median suture is that between the abdominals, the shortest that between the gulars or the humerals; the suture between the anals longer than that between the femorals; axillary small, inguinal minute or absent. Head moderate; upper jaw neither hooked nor notched; the width of the mandible at the symphysis equals the diameter of the orbit. Digits webbed to the claws. Tail about one fourth the length of the shell in the female. Carapace yellowish brown, closely speckled and lanceolated with black; plastron yellowish, dotted or spotted with black; head yellowish brown, speckled with black; a black, yellow-edged ocellus on each side of the occiput; upper and lower jaw vertically lineolated with black; neck with light longitudinal streaks, three on the upper surface.

Length of shell 14 centim.

China.

|                        |        |                       |            |
|------------------------|--------|-----------------------|------------|
| <i>a.</i> ♀, stffid.   | China. | J. Reeves, Esq. [P.]. | } (Types.) |
| <i>b.</i> Hgr., shell. | China. | J. Reeves, Esq. [P.]. |            |

5. *Clemmys insculpta*.

- Emys pulchella* (*non Schoepff*), *Schweigg. Prodr.* p. 34 (1814); *Dum. & Bibr.* ii. p. 251 (1835); Gray, *Cat. Tort.* p. 20 (1844).  
 — scabra (*non L.*), *Say, Journ. Ac. Philad.* iv. p. 204 (1825).  
*Terrapene scabra*, *Bonap. Osserv. s. Sec. Ed. d. R. A.* p. 157 (1830).  
*Testudo insculpta*, *Leconte, Ann. Lyc. N. Y.* iii. p. 112 (1830).  
*Emys speciosa*, Gray, *Syn. Rept.* p. 26 (1831).  
 — *insculpta*, *Harlan, Med. Phys. Res.* p. 152 (1835); *Holbr. N. Am. Herp.* i. p. 93, pl. xiii. (1842); *Dekay, Faun. N. York, Rept.* p. 14, pl. iv. fig. 8 (1842); *Wied, N. Acta Ac. Leop.-Carol.* xxxii. i. p. 11 (1865).  
*Geoclemmys pulchella*, Gray, *Cat. Sh. Rept.* i. p. 18 (1865).  
*Glyptemys insculpta*, *Agassiz, Contr. N. H. U. S. i.* p. 443 (1857).  
*Clemmys insculpta*, *Strauch, Chelon. Stud.* p. 104 (1862), and *Verth. Schildkr.* p. 66 (1865).  
*Glyptemys pulchella*, Gray, *Proc. Zool. Soc.* 1869, p. 196, and *Suppl. Cat. Sh. Rept.* i. p. 28 (1870).  
*Chelopus insculptus*, *Cope, Check-List N. Am. Rept.* p. 53 (1875).

Carapace rather strongly depressed, flattened on the vertebral

region, with a permanent obtuse keel; posterior border serrated; shields with strong radiating and concentric striæ; nuchal very narrow, almost linear; first vertebral not broader in front than behind; vertebrals 2 to 4 as broad as or a little narrower than the costals. Plastron large, concave in the male, angularly emarginate posteriorly; the width of the bridge but little less than the length of the hind lobe; abdominal shields larger than pectorals; the longest median suture is that between the abdominals, which, however, may be equalled by that between the anals; the shortest that between the humerals; axillary small, inguinal often absent. Head moderate; snout not prominent; upper jaw bicuspid and notched in the middle; the width of the mandible at the symphysis nearly equals the horizontal diameter of the orbit. Digits short, shortly webbed. Tail about one third the length of the shell in the female. Carapace blackish, with radiating yellow lines; plastron and lower surface of marginals yellow, each shield with a large black blotch. Soft parts dark brown or olive, sides of head speckled with red.

Length of shell 18 centim.

N.E. United States, from Maine to Pennsylvania and N. Jersey.

|                         |               |                         |
|-------------------------|---------------|-------------------------|
| <i>a.</i> ♀, stfdd.     | Pennsylvania. |                         |
| <i>b, c.</i> ♂ ♀, skel. | Pennsylvania. |                         |
| <i>d.</i> ♀, spir.      | N. America.   | Capt. J. Anderson [P.]. |
| <i>e, f.</i> ♂, skel.   | N. America.   |                         |
| <i>g.</i> ♀, shell.     | N. America.   |                         |

## 6. *Clemmys muhlenbergii*.

*Testudo muhlenbergii*, *Schoepff*, *Test.* p. 132, pl. xxxi. (1792); *Leconte*, *Ann. Lyc. N. Y.* iii. p. 119 (1830).

*Emys muhlenbergii*, *Schweigg. Prodr.* p. 41 (1814); *Dum. & Bibr.* ii. p. 304 (1835); *Holbr. N. Am. Herp.* i. p. 45, pl. iv. (1842); *Dekay, Faun. N. Y., Rept.* p. 17, pl. viii. fig. 15 (1842); *Gray, Cat. Tort.* p. 20 (1844).

— *biguttata*, *Say, Journ. Ac. Philad.* iv. p. 212 (1824).

*Terrapene muhlenbergii*, *Bonap. Osserv. s. sec. Ed. d. R. A.* p. 160 (1830).

*Geoclemys muhlenbergii*, *Gray, Cat. Sh. Rept.* i. p. 19 (1855), and *Suppl.* p. 27 (1870).

*Clemmys muhlenbergii*, *Agassiz, Contr. N. H. U. S.* i. p. 443 (1857).

*Clemmys muhlenbergii*, *Strauch, Chelon. Stud.* p. 32 (1862), and *Verth. Schildkr.* p. 67 (1865).

*Chelopus muhlenbergii*, *Cope, Check-List N. Am. Rept.* p. 53 (1875).

Closely allied to the preceding, but shell more convex, often with distinct areolations in the adult; vertebral shields 2 to 4 as broad as or a little broader than the costals; plastral bridge a little broader, as long as the longitudinal suture between the femoral and anal shields. Upper jaw with a cusp on each side of the median notch. Digits and claws very short; web very indistinct. Carapace dark brown, with yellowish or pale brown blotches or radiating lines; plastron blackish on the sides and behind, yellowish or pale brown in front and in the middle; head dark brown above, with or

without lighter variegations; a large, subtriangular orange spot on each side above the ear; limbs brownish yellow, with black and orange spots.

Length of shell 9 centim.

New York to North Carolina.

- |              |                            |                           |
|--------------|----------------------------|---------------------------|
| a. ♂, spir.  | Upper Darby, Pennsylvania. | Smithsonian Instit. [P.]. |
| b. ♀, spir.  | Pennsylvania.              |                           |
| c. ♀, stffd. | N. America.                |                           |

### 7. *Clemmys guttata*.

*Testudo guttata*, *Schneid. Schrift. Ges. Naturf. Fr.* x. p. 264 (1792).

— *punctata*, *Schoepff, Test.* p. 25, pl. v. (1792); *Daud. Rept.* ii. p. 159, pl. xxii. (1802); *Leconte, Ann. Lyc. N. Y.* iii. p. 117 (1830).

*Emys guttata*, *Schweigg. Prodr.* p. 40 (1814); *Dum. & Bibr.* ii. p. 295 (1835); *Holbr. N. Am. Herp.* i. p. 81, pl. xi. (1842); *Dekay, Faun. N. Y., Rept.* p. 13, pl. vi. fig. 12 (1842); *Gray, Cat. Tort.* p. 26 (1844); *Wied, N. Acta Ac. Leop.-Carol.* xxxii. i. p. 22 (1865).

— *punctata*, *Merr. Tent.* p. 24 (1820).

*Terrapene punctata*, *Bonap. Osserv. s. sec. Ed. d. R. A.* p. 159 (1830).

*Geoclemys guttata*, *Gray, Cat. Sh. Rept.* i. p. 19 (1855), and *Suppl.* p. 27 (1870).

*Nanemys guttata*, *Agassiz, Contr. N. H. U. S.* i. p. 442, pl. i. figs. 7-9 (1857).

*Clemmys guttata*, *Strauch, Chelon. Stud.* p. 107 (1862), and *Verth. Schildkr.* p. 67 (1865).

*Geoclemmys sebæ*, *Gray, Proc. Zool. Soc.* 1869, p. 188.

*Chelopus guttatus*, *Cope, Check-List N. Am. Rept.* p. 53 (1875).

Carapace moderately depressed, smooth and without trace of a keel in the adult; nuchal very narrow, often almost linear; vertebrals 2 to 4 much broader than long, a little narrower than the second costal. Plastron large, concave in the males, openly emarginate posteriorly; the width of the bridge much less than the length of the hind lobe; abdominal shields larger than pectorals; the longest median suture is that between the anal shields, the shortest that between the humerals; axillary and inguinal shields small or absent. Head moderate; snout not prominent; upper jaw not hooked, notched in the middle; the width of the mandible at the symphysis nearly equals the horizontal diameter of the orbit. Digits short, with short or rudimentary web; claws moderate. Tail about one third the length of the shell in the female, two fifths to one half in the male, two thirds in the young. Carapace deep black, each shield with one or more round yellow spots; plastron black and yellow, the black usually predominating; head black above, with a few round yellow spots, and a larger subtriangular one on each side above the ear; lips, lower surface of neck, and limbs black and yellow or reddish.

Length of shell 11 centim.

United States, east of Ohio and north of South Carolina.

|                    |                  |                           |
|--------------------|------------------|---------------------------|
| a. ♂, spir.        | Washington, D.C. | Smithsonian Instit. [P.]. |
| b. ♀, stffd.       | Delaware.        | E. Doubleday, Esq. [P.].  |
| c-e. ♂ ♀, spir.    | N. America.      | Dr. J. E. Gray [P.].      |
| f, g. ♂ ♀, spir.   | N. America.      |                           |
| h. ♂, skel.        | N. America.      |                           |
| i, k. ♂ ♀, shells. | N. America.      |                           |

### 8. *Clemmys marmorata*.

- Emys marmorata*, Baird & Gir. *Proc. Ac. Philad.* 1852, p. 177;  
*Bocourt, Miss. Sc. Mex., Rept.* p. 16 (1870).  
 — *nigra*, Hallow. *Proc. Ac. Philad.* 1854, p. 91, and *Rep. U. S.*  
*Explor. Surv. R. R.* x. pt. iv. p. 3, pl. i. (1859).  
*Actinemys marmorata*, Agassiz, *Contr. N. H. U. S.* i. p. 444, pl. iii.  
 figs. 5-8 (1857); Girard, *U. S. Explor. Exped., Herp.* p. 465,  
 pl. xxxii. (1858).  
*Clemmys marmorata*, Strauch, *Chelon. Stud.* p. 103 (1862), and *Verth.*  
*Schildkr.* p. 68 (1865).  
 — *wosnessenskyi*, Strauch, *Ucc.* p. 114, pl. —, & p. 68.  
*Geoclemys marmorata*, Gray, *Suppl. Cat. Sh. Rept.* i. p. 27 (1870).  
 — *wosnessenskyi*, Gray, *App. Cat. Sh. Rept.* p. 11 (1872).  
*Chelopus marmoratus*, Cope, *Check-List N. Am. Rept.* p. 53 (1875).

Strikingly resembling *Emys orbicularis*. Carapace obtusely unicarinate in the young, the keel becoming almost or quite indistinct in the adult; shields nearly smooth in the adult, with radiating striae in the young. Nuchal small, narrow; vertebrals 2 to 4 much broader than long, a little narrower than the second costal. Plastron large, concave in the male, openly emarginate posteriorly; the width of the bridge much less than the length of the hind lobe; pectoral and abdominal shields subequal in size; the longest median suture is that between the anals, the shortest that between the humerals; axillary and inguinal shields absent or small. Head rather large; upper jaw not hooked, notched in the middle; the width of the mandible at the symphysis nearly equals the horizontal diameter of the orbit. Digits webbed to the claws, which are long and strong. Tail about half as long as the shell in the males. Carapace dark olive or blackish, with yellowish dots or radiating lines, which markings may disappear in old specimens; plastron yellow, sutures black, with or without some large black blotches. Head olive or brown above, with small black markings, yellow inferiorly, uniform or black-dotted; limbs brown, spotted with black and yellow. Young coloured like those of *Emys orbicularis*.

Length of shell 18 centim.

California.

|                   |                              |                     |
|-------------------|------------------------------|---------------------|
| a-b. ♂, spir.     | Pacific Coast of N. America. |                     |
| c. Hgr. ♂, spir.  | Santa Cruz.                  | Mr. A. Forrer [C.]. |
| d. Hgr. ♂, shell. | San Diego.                   | Mrs. Rosa Smith     |
|                   |                              | Eigenmann [P.].     |



## 12. EMYS.

Emys, part., *Dumér. Zool. Anal.* p. 76 (1806); *Merrem, Tent.* p. 22 (1820); *Wagler, Syst. Amph.* p. 138 (1830); *Strauch, Chelon. Stud.* p. 27 (1862).

Emys, *Fleming, Phil. Zool.* ii. p. 270 (1822); *Bonap. Osserv. s. sec. Éd. d. R. A.* p. 164 (1830); *Agassiz, Contr. Nat. Hist. U. S. i.* p. 441 (1857).

Terrapene, part., *Bell, Zool. Journ.* ii. p. 308 (1825).

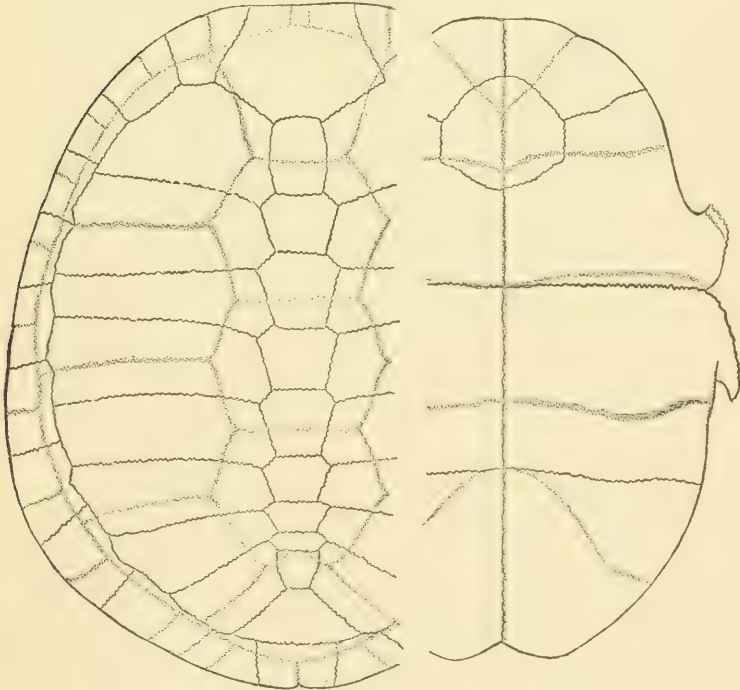
Cistudo, part., *Gray, Syn. Rept.* p. 17 (1831); *Dum. & Bibr.* ii. p. 207 (1835); *Gray, Cat. Tort.* p. 29 (1844).

Lutremys, *Gray, Cat. Tort.* p. 31, and *Cat. Sh. Rept. i.* p. 40 (1855), and *Suppl.* p. 22 (1870).

Emydoidea, *Gray, Suppl.* p. 19.

Neural plates hexagonal, short-sided in front. Plastron united to carapace by ligament, and more or less distinctly divided, in the adult, into two lobes movable upon a ligamentous hinge between

Fig. 31.

Shell of *Emys orbicularis*.

the hyo- and hyposternals, both of which bones contribute to the formation of the bridge; entoplastron intersected by the humero-

pectoral suture. Skull with a bony temporal arch; alveolar surfaces without median ridge; choanæ between the eyes. Upper surface of head covered with undivided skin. Digits webbed. Tail moderate in the adult, long in the young.

Europe, North-west Africa, Western Asia, Eastern North America.

### 1. *Emys orbicularis*.

- Testudo orbicularis*, *Linn. S. N.* i. p. 351 (1766).  
 — *europæa*, *Schneid. Schildkr.* p. 323 (1783); *Schoepff, Testud.* p. 1, pl. i. (1792); *Shaw, Zool.* iii. p. 30, pl. v. (1802); *Bojanus, Anat. Test. Eur.* (1819).  
 — *lutaria (non L.)*, *Schneid. l. c.* p. 338; *Daud. Rept.* ii. p. 115 (1802).  
 — *meleagris*, *Shaw, Nat. Misc.* iv. pl. cxliv. (1790).  
 — *pulchella*, *Schoepff, l. c.* p. 113, pl. xxvi.  
 — *flava*, *Daud. l. c.* p. 107.  
*Emys lutaria*, *Schweigg. Prodr.* p. 35 (1814); *Gravenh. Delic. Mus. Zool. Vratisl.* p. 11, pl. iii. (1829); *Bonap. Faun. Ital.* (1834); *Bianconi, Spec. Zool. Mosamb.* pl. xi. (1851); *De Betta, Erp. Veron.* p. 101 (1857); *Strauch, Chelon. Stud.* p. 101 (1862), and *Verth. Schildkr.* p. 49 (1865).  
 — *europæa*, *Schweigg. l. c.* p. 36; *Brandt & Ratzeb. Med. Zool.* i. p. 182, pl. xxi. (1829); *Schulz, Faun. March.* p. 442 (1845).  
 — *pulchella*, *Merr. Tent.* p. 25 (1820); *Gravenh. l. c.* p. 14, pl. iv.  
*Terrapene europæa*, *Bell, Zool. Journ.* ii. p. 308 (1826).  
*Cistudo europæa*, *Gray, Syn. Rept.* p. 19 (1831); *Bibron & Bory, Expéd. Sc. Morée*, iii. p. 61, pl. ix. fig. 1 (1833); *Dum. & Bibr.* ii. p. 220 (1835); *Gray, Cat. Tort.* p. 31 (1844); *Fatio, Vert. Suisse*, iii. p. 35 (1872); *De Betta, Faun. Ital., Rett. Anf.* p. 13 (1874); *Lataste, Herp. Gir.* p. 36 (1876).  
 — *hellenica (Val.)*, *Bibr. & Bory, l. c.* pl. viii. (1832?).  
*Lutremys europæa*, *Gray, Cat. Sh. Rept.* i. p. 40 (1855); *Lortet, Arch. Mus. Lyon*, iv. p. 15, pl. vi. (1887).  
*Cistudo lutaria*, *Strauch, Erp. Alg.* p. 17 (1862); *Schreib. Herp. Eur.* p. 537 (1875).  
*Emys orbicularis*, *Blanf. Zool. E. Persia*, p. 308 (1876); *Bouleng. Proc. Zool. Soc.* 1887, p. 555, pl. 1. fig. 2.

### References to Fossil remains:—

- Emys turfa*, *H. v. Meyer, N. Jahrb. f. Min.* 1835, p. 67, and *Mus. Senckenb.* ii. p. 60 (1837).  
 — *lutaria*, var. *borealis*, *Nilsson, Sv. Vet. Ak. Handl.* f. 1839, p. 194, pls. iii. & iv. (1841).  
 — *lutaria*, *Steenstr. Overs. Vid. Selsk. Forh.* 1848, p. 74, and 1855, p. 1; *A. Newton, Ann. & Mag. N. H.* (3) x. p. 224, pls. vi., vii. (1862); *E. T. Newton, Geol. Mag.* (2) vi. p. 304, pl. viii. (1879); *H. B. Woodward, Tr. Norf. & Norw. Nat. Soc.* iii. p. 36 (1880).  
*Cistudo europæa*, *Rütim. Mitth. Antiq. Ges. Zürich*, xiii. p. 41 (1860).  
*Emys europæa*, *Jäger, Bull. Soc. Nat. Moscou*, 1861, p. 190; *H. v. Meyer, Palæontogr.* xv. p. 208, pl. xxxv. (1867); *Sordelli, Atti Soc. Ital. Sc. Nat.* xv. p. 152, pl. iii. (1872).  
*Lutremys europæa*, *Portis, Boll. Comit. Geol. Ital.* 1887, p. 50.

Carapace a short oval, broadest posteriorly, its width more than

two thirds its length; young with a distinct keel, which disappears more or less completely in the adult. Nuchal small, longer than broad; first vertebral broader in front than behind; vertebrae 2 to 4 much broader than long. Plastron large, but not closing entirely the shell; width of bridge nearly one fourth the length of the plastron; the bridge formed to a lesser extent by the hypoplastron than by the hypoplastron, the peduncle of which is also more developed; hind lobe truncate or openly emarginate; pectoral and abdominal shields subequal in size; the longest median suture is that between the anals, the shortest (usually) that between the humerals; axillary and inguinal shields absent or small. The smallest diameter of the interorbital space equals the vertical diameter of the orbit; upper jaw not hooked, broadly emarginate in the middle; the length of the mandible equals about four times its diameter at the symphysis. Limbs scaly, extensively webbed. Tail with more or less distinctly verticillate scales, about as long as the shell in the young, two thirds that length in the adult males, half or a little less in the females. Carapace dark brown or black, with more or less numerous light (usually yellow) dots or radiating lines; plastron yellow, brown and yellow, or nearly entirely blackish brown in the adult; shell of young dark brown above, black inferiorly, with a large yellow spot on each marginal and on the outer side of each plastral shield. Head dark brown or black, with lighter dots, which are yellow in the female and pale brown in the male; lower surface of head and neck yellow, spotted with blackish. Limbs and tail blackish, more or less abundantly spotted with yellow.

Specimen *h* is remarkable for the predominance of the yellow colour, the carapace being yellow, each shield with fine black radiating lines\*.

Length of shell 19 centim.

South Europe, East Central Europe, South-western Asia, Algeria.

Has been found in Pleistocene deposits in Sweden, Denmark, Norfolk, Belgium, Germany, Switzerland, and Lombardy.

- |                                                                                                                  |                                        |                            |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------|
| <i>a.</i> Numerous skeletons, shells, and dry preparations, made by Bojanus, and figured in his anatomical work. | Poland.                                | Sir R. Owen [P.].          |
| <i>b.</i> ♀, skel.                                                                                               | Berlin.                                | Dr. A. Günther [C.].       |
| <i>c.</i> Yg., spir.                                                                                             | Albania.                               | W. W. Saunders, Esq. [P.]. |
| <i>d-e.</i> Yg., spir.                                                                                           | Venice.                                | Lord A. Russell [P.].      |
| <i>f.</i> Many specs., ♂, ♀, hgr., and yg., spir.                                                                | Chirignago, near Mestre, Prov. Verona. | M. de Betta [P.].          |
| <i>g.</i> ♀, spir.                                                                                               | Talais, Gironde.                       | M. F. Lataste [P.].        |
| <i>h.</i> ♀, spir.                                                                                               | Laguna Almenara, Castellon.            | Lord Lilford [P.].         |

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\* In a young specimen from Mahon, Baleares, in M. Lataste's collection, the yellow likewise predominates on the carapace.

|                             |                                  |                            |
|-----------------------------|----------------------------------|----------------------------|
| <i>i.</i> ♀, stffil.        | Astrakan ?                       |                            |
| <i>k, l.</i> ♀ & yg., skel. | Europe.                          |                            |
| <i>m.</i> ♀, spir.          | Enzeli, on the Cas-<br>pian Sea. | W. T. Blanford, Esq. [C.]. |
| <i>n.</i> ♀, shell.         | Enzeli, on the Cas-<br>pian Sea. | W. T. Blanford, Esq. [C.]. |
| <i>o, p.</i> ♂ ♀, spir.     | Bismil, Kurdistan.               | Dr. Lortet [P.].           |

## 2. *Emys blandingii*.

*Cistuda blandingii*, *Holbr. N. Am. Herp.* i. p. 39, pl. iii. (1842);

*Dekay, Fawn. N. York, Rept.* p. 25, pl. i. fig. 2 (1842).

*Lutremys meleagris* (*non Shaw*), *Leconte, Proc. Ac. Philad.* 1854, p. 189.

*Emys meleagris*, *Agassiz, Contr. N. H. U. S. i.* p. 442, pl. iv. figs. 20–22 (1857).

— *blandingii*, *Strauch, Chelon. Stud.* p. 28 (1862), and *Verth. Schildkr.* p. 56 (1865); *Bouleng. Proc. Zool. Soc.* 1887, p. 555, pl. l. fig. 1.

*Emydoidea blandingii*, *Gray, Cat. Sh. Rept., Suppl.* p. 19 (1870).

Carapace rather more elongate than in *E. orbicularis*, its greatest width about two thirds of its length in the adult. Postorbital part of the head much longer; interorbital space narrower; the width of the mandibular symphysis one sixth the length of the mandible. Tail shorter; of male about twice and two thirds in the length of the shell, of female four times, of young once and a half. Carapace black, with round pale yellowish or brownish spots; plastron yellow, with a large black blotch on the outer and posterior side of each shield. Head dark brown above, with lighter dots or vermiculations, uniform bright yellow inferiorly; limbs black and yellow.

Length of shell 21 millim.

N.E. United States; Canada.

|                                      |           |
|--------------------------------------|-----------|
| <i>a-b, c-e.</i> ♂, ♀, & hgr., spir. | Michigan. |
| <i>f.</i> ♀, stffil.                 | Michigan. |
| <i>g.</i> ♀, skel.                   | — ?       |

## 13. CISTUDO.

*Terrapene*, part., *Merrem, Tent.* p. 27 (1820); *Bell, Zool. Journ.* ii. p. 308 (1825); *Fitzing. N. Class. Rept.* p. 6 (1826); *Strauch, Chelon. Stud.* p. 25 (1862).

*Cistuda*, part., *Fleming, Phil. Zool.* ii. p. 270 (1822).

*Cistudo*, *Bonap. Osserv. s. sec. Ed. d. R. Anim.* p. 162 (1830); *Gray, Cat. Sh. Rept.* i. p. 39 (1855), and *Suppl.* p. 18 (1870); *Agassiz, Contr. N. H. U. S. i.* p. 444 (1857).

*Emys*, part., *Wagler, Syst. Amph.* p. 138 (1830).

*Cistudo*, part., *Gray, Syn. Rept.* p. 17 (1831); *Dum. & Bibr.* ii. p. 207 (1834); *Gray, Cat. Tort.* p. 29 (1844).

*Diclidia*, part., *Rafin. Atlant. Journ.* p. 64 (1832).

*Pyxidemys*, part., *Fitzing. Ann. Wien. Mus.* i. p. 114 (1835).

*Emyoides*, *Gray, Cat. Tort.* p. 27.

*Onychotria*, *Gray, Proc. Zool. Soc.* 1849, p. 17.

Neural plates mostly hexagonal, short-sided in front, the eighth absent, the corresponding costals meeting on the median line. Plastron divided into two movable lobes separated from each other and from the carapace by ligament; entoplastron intersected by the humero-pectoral suture. No bony temporal arch; alveolar surface without median ridge; choanæ between the eyes. Upper surface of head covered with undivided skin. Digits almost free, or with a very short web. Tail short.

North America.

Fig. 32.



Skull of *Cistudo carolina*. (From Gray, P. Z. S. 1869.)

### 1. *Cistudo carolina*.

*Edwards, Nat. Hist.* iv. pl. ccv. (1750); *Bloch, Schrift. Ges. Naturf.*

*Fr. Berl.* vii. p. 131, pl. i. (1787).

*Testudo carolina*, *Linn. S. N.* i. p. 352 (1766); *Daud. Rept.* ii. p. 207 (1802).

— *carinata*, *Linn. l. c.* p. 353.

— *clausa*, *Gmel. S. N.* i. p. 1042 (1789); *Schoepff, Test.* p. 32, pl. vii. (1792); *Daud. l. c.* p. 207, pl. xxiii. figs. 1 & 2; *Leconte, Ann. Lyc.*

*N. Y.* iii. p. 124 (1830).

— *virgulata*, *Daud. l. c.* p. 201, pl. xxiii. figs. 3 & 4.

*Emys clausa*, *Schweigg. Prodr.* p. 46 (1814).

— *virgulata*, *Schweigg. l. c.* p. 47.

— *schneideri*, *Schweigg. l. c.* p. 48.

*Terrapene clausa*, *Merr. Tent.* p. 28 (1820); *Bell, Test.* (1836).

*Cistudo clausa*, *Say, Journ. Ac. Philad.* iv. p. 214 (1825).

*Terrapene carolina*, *Bell, Zool. Journ.* ii. p. 309 (1825).

— *maculata*, *Bell, l. c.*

? *Terrapene nebulosa*, *Bell, l. c.* p. 310.

*Cistudo carolina*, *Gray, Syn. Rept.* p. 18 (1831); *Dum. & Bibr.* ii.

p. 210 (1835); *Holbr. N. Am. Herp.* i. p. 31, pl. ii. (1842); *Gray,*

*Cat. Tort.* p. 30 (1844), and *Sh. Rept.* i. p. 39 (1855); *Wied, N. Act.*

*Ac. Leop.-Carol.* xxxii. i. p. 1, pl. i. fig. I (1865); *Gray, Suppl. Cat.*

*Sh. Rept.* i. p. 19 (1870).

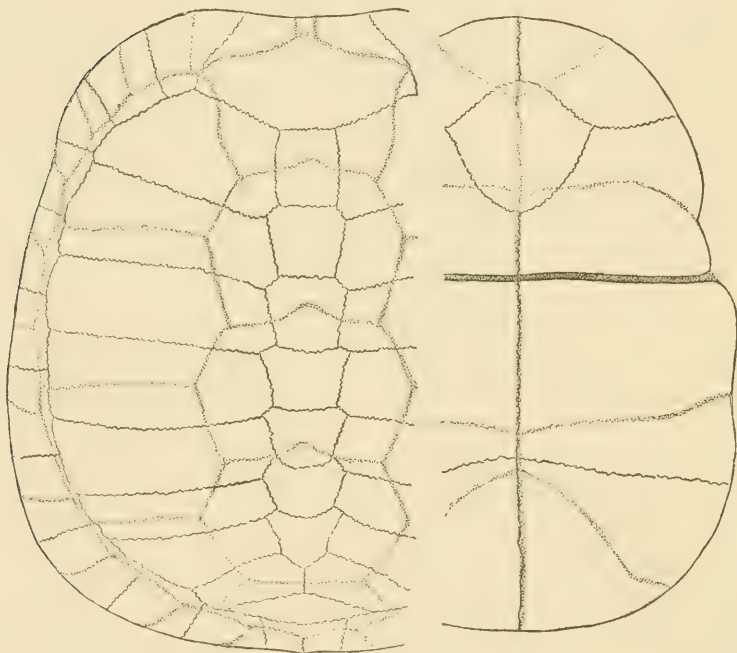


*Cistudo virginea*, Agassiz, *Contr. N. H. U. S.* i. p. 445, pl. iv. figs. 17-19 (1857).

*Terrapene carinata*, Strauch, *Chelon. Stud.* p. 96 (1862), and Verth. *Schildkr.* p. 45 (1865).

Carapace very convex, subhemispherical or shortly oval, with at least a trace of an obtuse vertebral keel which is more distinct in the young. Vertebral shields broader than long, and narrower than the costals. Plastron hermetically closing the shell, without trace of a bridge, broader posteriorly than anteriorly; the abdominal

Fig. 33.



Shell of *Cistudo carolina*.

shields, and a very short portion of the pectorals, in contact with the marginals; the longest plastral shields are the femorals or the anals, the smallest the gulars; the longest median suture is that between the anals; abdominals larger than pectorals. Upper jaw hooked, the hook entire. Limbs scaly. Digits with a very indistinct web. Carapace usually dark brown or blackish, with yellow spots; or brownish yellow with dark brown spots or rays; frequently an interrupted yellow streak follows the vertebral ridge; plastron brown or blackish, uniform or with irregular yellowish blotches or

rays, or yellowish with smaller or larger blackish blotches. Head, neck, and limbs brown, with yellow or orange spots or marblings.

Length of shell 13 centim.

East United States.

|                         |                          |                      |
|-------------------------|--------------------------|----------------------|
| a. Hgr., spir.          | Iowa.                    | Smithsonian Instit.  |
| b. ♂, spir.             | New Haven, Conn.         | Dr. G. Baur [P.].    |
| c. ♀, spir.             | Charleston, S. Carolina. | Dr. G. Baur [P.].    |
| d. ♀, stffld.           | N. America.              | Dr. J. E. Gray [P.]. |
| e. ♀, stffld.           | N. America.              | Dr. J. Green [P.].   |
| f, g. ♀ & hgr., stffld. | N. America.              | Gen. Hardwicke [P.]. |
| h, i. ♂ ♀, stffld.      | N. America.              |                      |
| k. ♂, skel.             | N. America.              |                      |
| l. ♀, skel.             | N. America.              | Dr. Günther [P.].    |
| m. ♀, spir.             | N. America.              |                      |

The three following forms, which I provisionally admit as varieties, perhaps deserve to rank as species:—

#### Var. major.

*Cistudo major*, *Agassiz, Contr. N. H. U. S. i. p. 445 (1857)*.

Larger and more oval, less gibbose. Hook of upper jaw notched, bicuspid. Digits shortly but very distinctly webbed. Carapace brown with yellow spots, or yellowish olive with dark brown dots and margins to the shields; plastron yellow, the sutures between the shields blackish. Head and limbs brown with yellow or orange spots.

Length of shell 17 centim.

Louisiana, Alabama, Florida.

|                          |             |                  |
|--------------------------|-------------|------------------|
| a, b, c, d. ♂ ♀, stffld. | Louisiana.  | W. P. Smith [C.] |
| e, f. ♂ ♀.               | N. America. |                  |

#### Var. cinosternoides.

*Emys kinosternoides*, *Gray, Syn. Rept. p. 32 (1831)\**; *Dum. & Bibr. ii. p. 303 (1835)*; *Gray, Cat. Tort. p. 27 (1844)*.

*Cistudo triunguis*, *Agassiz, Contr. N. H. U. S. i. p. 445 (1857)*.

Shell as in the typical form. Hook of upper jaw notched, bicuspid. No trace of web between the digits; only three clawed functional digits to the hind limb. Carapace pale olive or yellowish, with or without dark spots; plastron uniform yellowish, with the sutures blackish.

Length of shell 13 centim.

S.E. United States.

|             |              |                     |
|-------------|--------------|---------------------|
| a. ♀, spir. | Mississippi. | Smithsonian Instit. |
| b. ♀, spir. | — ?          | Zoological Society. |
| c. ♂, skel. | — ?          |                     |

\* Type (in College of Surgeons) examined.

Var. *mexicana*.

*Cistudo* (*Onychotria*) *mexicana*, *Gray, Proc. Zool. Soc.* 1849, p. 17, pl. ii.

— *mexicana*, *Gray, Cat. Sh. Rept.* i. p. 40 (1855), and *Suppl.* p. 19 (1870); *Bocourt, Miss. Sc. Mex., Rept.* p. 17 (1870); *Günth. Biol. C.-Am., Rept.* p. 1 (1885).

*Onychotria mexicana*, *Dugès, La Naturelle*, 1888, p. —.

Carapace oval, more tectiform; an additional, smaller, vertebral shield between the fourth and fifth; second costal shield twice as broad as long. Hook of upper jaw notched, bicuspid. No distinct web between the digits; only three claws to the hind limb. Carapace brown with yellow spots or radiating lines; plastron variegated brown and yellow. Head uniform yellow above; limbs brown, with yellow spots.

Length of shell 17 centim.

Mexico.

*a, b.* ♀, stffid.

Mexico.

(Types.)

2. *Cistudo ornata*.

*Cistudo ornata*, *Agassiz, Contr. N. H. U. S.* i. p. 445, pl. iii. figs. 12 & 13 (1857).

Carapace short, rather depressed, the vertebral region flat and without any keel or ridge, even in the young; shields as in *C. carolina*. Plastron not closing completely the shell, connected with the carapace by a very short but distinct bridge. Hook of upper jaw notched. Digits without distinct web. Carapace and plastron dark brown or black, elegantly marked with yellow spots and radiating lines; a yellow vertebral line. Head and limbs brownish, with yellow spots.

Length of shell 12 centim.

Nebraska, Kansas, Iowa, Missouri, Illinois.

*a-d.* ♀ & yg., spir. Southern Bonn, Kansas. Smithsonian Institution.  
*e.* ♂, shell. N. America.

14. *NICORIA*.

*Chersine*, part., *Merrem, Tent.* p. 29 (1820).

*Emys*, part., *Dum. & Bibr.* ii. p. 232 (1835); *Gray, Cat. Tort.* p. 14 (1844), and *Cat. Sh. Rept.* i. p. 19 (1855); *Günth. Rept. Brit. Ind.* p. 21 (1864).

*Geoemyda*, part., *Gray, Proc. Zool. Soc.* 1834, p. 100, and *Cat. Tort.* p. 14.

*Nicoria*, *Gray, Cat. Sh. Rept.* i. p. 17, and *Suppl.* p. 26 (1870).

*Clemmys*, part., *Strauch, Chelon. Stud.* p. 28 (1862).

*Rhinoclemmys*, *Gray, Ann. & Mag. N. H.* (3) xii. p. 182 (1863); and *Suppl. Cat. Sh. Rept.* i. p. 29.

*Chelopus*, part., *Cope, Proc. Ac. Philad.* 1865, p. 185.

*Melanochelys*, *Gray, Proc. Zool. Soc.* 1869, p. 187, and *Suppl. Cat. Sh. Rept.* i. p. 33.

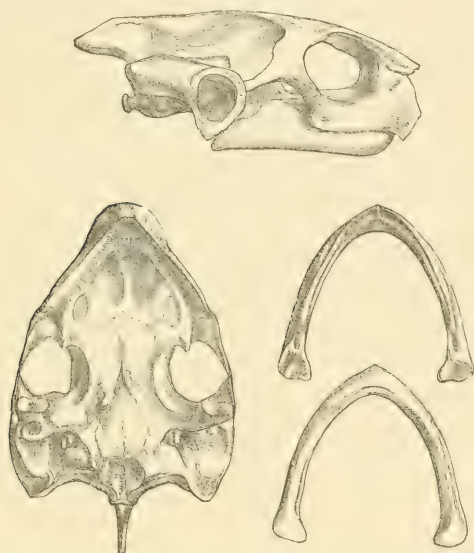
*Geoclemmys*, part., *Gray, Suppl. Cat. Sh. Rept.* i. p. 26.

Neural plates mostly hexagonal, short-sided behind, or alternately

tetragonal and octagonal. Plastron extensively united to the carapace by suture, with short axillary and inguinal buttresses, just reaching the first and fifth costal plates respectively; entoplastron intersected by the humero-pectoral suture. Skull with a bony temporal arch; alveolar surfaces without median ridge; choanæ between the eyes. Upper surface of head covered with undivided skin. Digits with a short web, or without. Tail short, not longer in the young than in the adult.

East Indies; Central and South America.

Fig. 34.



Skull of *Nicoria trijuga*. (From Gray, P. Z. S. 1869.)

*Synopsis of the Species.*

I. Carapace tricarinate.

- Anterior and posterior margin of carapace strongly serrated; beak strongly hooked. 1. *spengleri*, p. 120.  
 Borders of carapace not serrated; beak more or less distinctly notched . . . . . 2. *trijuga*, p. 121.

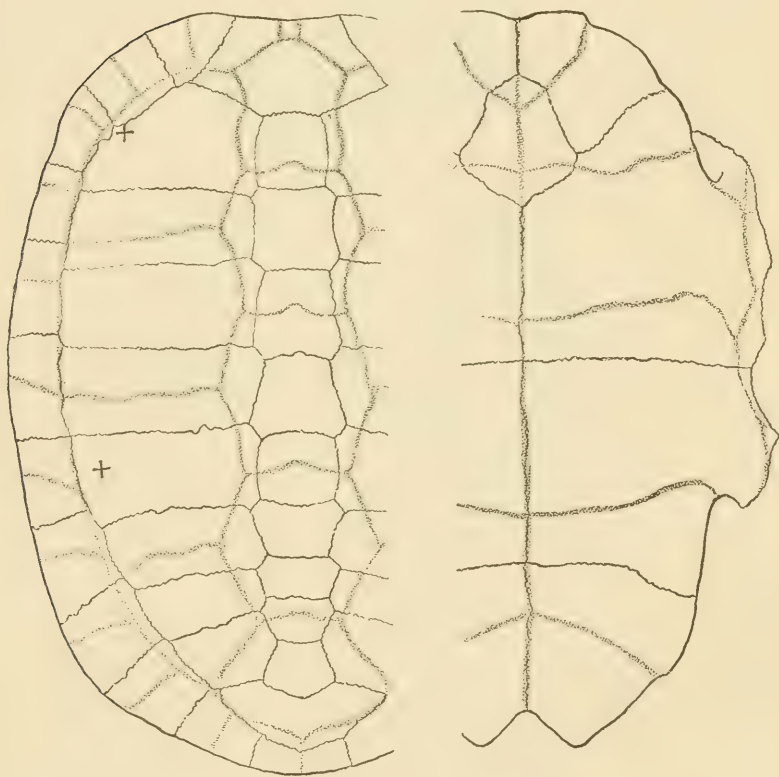
II. Carapace unicarinate.

- Digits shortly but distinctly webbed; second vertebral shield not or but slightly broader than long in the adult . . . . . 3. *punctularia*, p. 123.  
 Digits very shortly webbed; second vertebral shield broader than long; a row of large scales on the inner front of the lower half of the tibia . . . . . 4. *gabbii*, p. 126.

No web between the digits; width of the mandible at the symphysis less than the horizontal diameter of the orbit; second vertebral shield much broader than long 5. *annulata*, p. 126.

No web between the digits; width of the mandible at the symphysis equal to the horizontal diameter of the orbit; second vertebral shield much broader than long 6. *rubida*, p. 127.

Fig. 35.

Shell of *Nicoria trijuga*.

### 1. *Nicoria spengleri*.

Walbaum, *Schr. ges. Naturf. Freunde*, vi. p. 122, pl. iii. (1785).

*Testudo spengleri*, *Gmel. S. N.* i. p. 1043 (1789); *Daud. Rept.* ii, p. 103 (1802).

— *serrata*, *Shaw, Zool.* iii. p. 51, pl. ix, fig. 2 (1802).



- Testudo tricarinata*, *Bory de St. Vinc. Voy. dans les quatre princ. Iles des Mers d'Afrique*, ii. p. 308, pl. xxxvii. fig. 1 (1804).  
*Emys spengleri*, *Schweigg. Prodr.* p. 41 (1814); *Dum. & Bibr.* ii. p. 307 (1835).  
*Geomyda spengleri*, *Gray, Proc. Zool. Soc.* 1834, p. 100, and *Cat. Tort.* p. 14 (1844).  
*Nicoria spengleri*, *Gray, Cat. Sh. Rept.* i. p. 17 (1855).  
*Clemmys spengleri*, *Strauch, Chelon. Stud.* p. 32 (1862), and *Verth. Schildkr.* p. 63 (1865).

Carapace much depressed, strongly tricarinate; anterior border serrated, posterior border expanded and very strongly serrated, each marginal being acutely pointed. Vertebral shields broader than long, about as broad as the costals; nuchal moderate, trapezoid, broadest and emarginate posteriorly. Plastron large; the width of the bridge about equals the length of the posterior lobe, which is broadly notched; front lobe openly emarginate anteriorly. As regards size, the plastral shields take the following order, commencing with the largest: abdominals, femorals, pectorals, humerals, anals, gulars; no axillary or inguinal shields. Beak strongly hooked, not notched; the width of the mandible at the symphysis is less than the diameter of the orbit. Tail a little longer than the head. Yellowish brown above, speckled with brown and with traces of black lines following the dorsal keels; plastron blackish brown, with a yellowish band on each side, which separates the blackish colour of the bridge from that of the rest of the plastron.

Length of carapace 10 centim.

Sumatra, Borneo; Southern China?

|                 |        |                       |
|-----------------|--------|-----------------------|
| a. ♀, stiffd.   | China. | J. Reeves, Esq. [P.]. |
| b. ♀, spir.     | —?     | Zoological Society.   |
| c. Hgr., shell. | —?     |                       |

## 2. *Nicoria trijuga*.

- ? *Testudo scabra*, *Linn. S. N.* i. p. 351 (1766).  
*Emys trijuga*, *Schweigg. Prodr.* p. 41 (1814); *Dum. & Bibr.* ii. p. 310 (1834); *Gray, Cat. Tort.* p. 16 (1844), and *Sh. Rept.* i. p. 20 (1855).  
 — *belangeri*, *Lesson in Bélang. Voy. Ind. Or., Zool.* p. 291, pl. i. (1834).  
*Clemmys trijuga*, *Strauch, Chelon. Stud.* p. 32 (1862), and *Verth. Schildkr.* p. 66 (1865).  
*Melanochelys trijuga*, *Gray, Proc. Zool. Soc.* 1869, p. 187, and *Suppl. Cat. Sh. Rept.* i. p. 33 (1870), and *Ann. & Mag. N. H.* (4) xi. p. 297 (1873); *Theob. Cat. Rept. Brit. Ind.* p. 12 (1876).  
 — *sebæ*, *Gray, l. c.* p. 34.  
*Emys trijuga*, var. *maderaspatana*, *Anders. Zool. Res. Yunnan*, p. 729 (1879).

Carapace moderately depressed, tricarinate. Vertebral shields in the adult as long as broad or longer than broad, and much narrower than the costals; nuchal moderate or small, sometimes absent.

Plastron large; the width of the bridge equals or a little exceeds the length of the posterior lobe, which is broadly notched; front lobe truncate. Proportions of the plastral shields as in the preceding species; axillary and inguinal shields present. Upper jaw not hooked, notched mesially; the width of the mandible at the symphysis is less than the diameter of the orbit. Digits distinctly webbed. Tail shorter than the head. Shell brown, with a yellow band on each side of the plastron; keels sometimes yellowish. Head brown, in the young reticulated with yellowish (in spirit), and with a yellowish line from the eye to above the tympanum.

Length of shell 22 centim.

India.

|                                |                                       |                       |
|--------------------------------|---------------------------------------|-----------------------|
| <i>a, b.</i> ♀ & hgr., shells. | Ramandroog, near Bel-lary, 3000 feet. | Lord Dormer [P.].     |
| <i>c.</i> Yg., shell.          | Poonah.                               | Dr. Leith [P.].       |
| <i>d.</i> Yg., spir.           | Malabar.                              | Col. Beddome [C.].    |
| <i>e.</i> Hgr., stffid.        | India.                                | Dr. J. E. Gray [P.].  |
| <i>f.</i> Yg., spir.           | India.                                | Lord A. Russell [P.]. |
| <i>g.</i> Ad., skull.          | India.                                | Prof. Oldham [P.].    |

#### Var. *thermalis*.

*Emys thermalis*, Lesson, *Cent. Zool.* p. 86, pl. xxix. (1830).

*Emys trijuga*, Kelaart, *Prodr. Faun. Zeyl.* p. 177 (1852); Günth.

*Rept. Brit. Ind.* p. 29, pl. ii. fig. C (1864).

*Geoclemmys seba*, Gray, *Cat. Sh. Rept.* i. p. 18.

*Clemmys thermalis*, Strauch, *Chelon. Stud.* p. 32, and *Verth. Schildkr.* p. 66.

*Melanochelys sebæ*, Theob. *Cat. Rept. Brit. Ind.* p. 12.

*Emys trijuga*, var. *sebæ*, Anders. *l. c.*

Shell dark brown in the young, with a broad yellow border to the plastron; keels often yellowish; shell of adult deep black, with a narrow yellow border to the plastron. Soft parts blackish; head of young and halfgrown with irregular bright-orange spots, which disappear in the adult.

Length of shell 21 centim.

Ceylon.

|                                   |                                          |                          |
|-----------------------------------|------------------------------------------|--------------------------|
| <i>a, b.</i> ♂ ♀, stffid.         | Ceylon.                                  | Zoological Society.      |
| <i>c.</i> Yg., spir.              | Ceylon.                                  | Zoological Society.      |
| <i>d.</i> ♀, shell.               | Ceylon.                                  | Dr. Kelaart.             |
| <i>e.</i> ♀, shell.               | Ceylon.                                  |                          |
| <i>f-g.</i> Yg., spir.            | Ceylon.                                  | B. H. Barnes, Esq. [P.]. |
| <i>h.</i> Yg., spir.              | Ceylon.                                  | Col. Beddome [C.].       |
| <i>i, k, l.</i> Hgr. & yg., spir. | Ceylon.                                  |                          |
| <i>m.</i> Yg., spir.              | Trincomalee.                             |                          |
| <i>n.</i> Hgr., spir.             | Diego Garcia, Chandos Group (imported?). | G. C. Bourne, Esq. [C.]. |
| <i>o, p.</i> ♀ and hgr., shells.  | — ?                                      |                          |

Var. *edeniana*.

*Melanocheilus edeniana*, *Theob. l. c.*

*Emys trijuga*, var. *burmana*, *Anders. l. c.* p. 729, pls. lvii. & lviii.

A larger race, with the shell deep black, with a sternal border, and sometimes also the keels, yellowish. Light markings on the head, if present, small.

Length of shell 40 centim.

Burma.

*a-f.* Hgr. & yg., spir.

Bhamo.

M. L. Fea [C.].

*g, h.* ♂ ♀, shells.

Burma.

W. Theobald, Esq. [C.].

3. *Nicoria punctularia*.

*Testudo scabra* (*non L.*), *Daud. Rept. ii.* p. 129 (1802).

— *punctularia*, *Daud. l. c.* p. 249.

*Emys punctularia*, *Schweigg. Prodr.* p. 36 (1814); *Dum. & Bibr. ii.* p. 243 (1835); *Günth. Biol. C.-Am., Rept.* p. 9 (1885).

*Chersine punctularia*, *Merr. Tent.* p. 29 (1820).

*Emys dorsalis*, *Spix, Test. Bras.* p. 11, pl. ix. figs. 1 & 2 (1824).

— *scabra*, *Gray, Syn. Rept.* p. 24 (1831); *Bell, Mon. Test.* p. —, pls. xxix. & xxx. (1834); *Gray, Cat. Tort.* p. 20 (1844), and *Cat. Sh. Rept. i.* p. 31 (1855).

*Clemmys punctularia*, *Strauch, Chelon. Stud.* pp. 33 & 128 (1862), and *Verth. Schildkr.* p. 81 (1865).

*Geoclemmys callocephalus*, *Gray, Proc. Zool. Soc.* 1863, p. 254, and *Suppl. Cat. Sh. Rept. i.* p. 27 (1870).

*Rhinoclemmys scabra*, *Gray, Ann. & Mag. N. H.* (3) xii. p. 182 (1863), and *Suppl. Cat. Sh. Rept. i.* p. 30, and *Proc. Zool. Soc.* 1870, p. 722, fig.

— *bellii*, *Gray, ll. cc.*

? *Chelopus punctularius*, *Cope, Proc. Ac. Philad.* 1865, p. 185.

*Rhinoclemmys lunata*, *Gray, Ann. & Mag. N. H.* (4) xi. p. 144 (1873).

— *callocephala*, *Gray, l. c.*

— *ventricosa*, *Gray, l. c.* p. 145.

Carapace moderately depressed, unicarinate, often openly emarginate anteriorly. Vertebral shields, in the adult, about as broad as long, and much narrower than the costals; nuchal very small, sometimes absent. Plastron large; the width of the bridge exceeds the length of the posterior lobe, which is broadly notched; front lobe truncate or openly emarginate anteriorly. Axillary and inguinal shields present, small. Dorsal shields granular, rough, in the young. Head small, snout projecting; upper jaw not hooked, with a slight, sometimes indistinct notch; the width of the mandible at the symphysis is much less than the horizontal diameter of the orbit. Digits shortly but distinctly webbed. Tail not longer than the head. Shell dark brown, plastron bordered with yellowish. Head dark brown above, with an oblique yellowish (red) band on each side, from above the orbit to above the ear, sometimes uniting with its fellow across the forehead; a pair of roundish red spots in front of the orbits and another on the occiput; sides of head and

neck yellowish, lined with black. Upper surface of limbs yellowish (red?) dotted with black.

Length of shell 20 centim.

Northern Brazil, Guianas, Venezuela; Mexico?

|                                           |                 |                                    |
|-------------------------------------------|-----------------|------------------------------------|
| <i>a.</i> Yg., spir.                      | British Guiana. |                                    |
| <i>b, c.</i> Yg., spir.                   | Dutch Guiana?   |                                    |
| <i>d, e, f, g, h.</i> ♀ & yg., skeletons. | Dutch Guiana.   |                                    |
| <i>i, k, l.</i> Hgr., shells.             | Dutch Guiana.   | (Type of <i>R. ventricosa</i> .)   |
| <i>m.</i> ♀, shell.                       | Dutch Guiana.   | (Types of <i>R. lunata</i> .)      |
| <i>n-o.</i> Yg., sp.                      | Dutch Guiana.   | Zoological Society.                |
| <i>p.</i> Yg., stf'd.                     | Trinidad.       | Zoological Society.                |
| <i>q.</i> ♀, shell.                       | Trinidad.       | Governor Rawson [P.].              |
| <i>r.</i> ♂, stf'd.                       | Venezuela.      | (Type of <i>G. callocephala</i> .) |
| <i>s.</i> ♀, stf'd.                       | S. America.     |                                    |
| <i>t, u.</i> Hgr. & yg., stf'd.           | S. America.     |                                    |
| <i>v, w.</i> Yg., spir.                   | S. America.     |                                    |

#### Var. *melanosternum*.

*Emys dorsalis* (*non Spix*), *Gray, Cat. Sh. Rept.* i. p. 32, pl. xiv. A (1855).

*Geoclemys melanosterna*, *Gray, Proc. Zool. Soc.* 1861, p. 205.

*Rhinoclemmys melanosterna*, *Gray, Ann. & Mag. N. H.* (3) xii. 1863, p. 183, and *Suppl. Cat. Sh. Rept.* i. p. 31 (1870), and *Proc. Zool. Soc.* 1870, p. 722, fig.

*Clemmys melanosterna*, *Strauch, Verth. Schildkr.* p. 82 (1865).

Head dark brown above, with a broad light band along each side from the snout to the neck, bordering the orbit above; two other light bands on each side, passing through the eye. Upper side of neck brown; fore limbs and lower surface of hind limbs, sides, and lower surface of neck orange (red?), with large black spots or marblings.

Colombia.

|                        |                             |                             |            |
|------------------------|-----------------------------|-----------------------------|------------|
| <i>a.</i> ♀, stf'd.    | River Buenaventura.         | J. O. Goodridge, Esq. [C.]. | } (Types.) |
| <i>b.</i> Hgr., stf'd. | Chirambira, Gulf of Darien. |                             |            |
|                        |                             |                             |            |

#### Var. *areolata*.

*Emys areolata*, *A. Dum. Cat. Méth. Rept.* p. 10 (1851), and *Arch. Mus.* vi. p. 223, pl. xiv. (1852); *Bocourt, Miss. Sc. Mex., Rept.* p. 13 (1870); *Günth. Biol. C.-Am., Rept.* p. 8, pl. viii. fig. B (1885).

*Clemmys areolata*, *Strauch, Chelon. Stud.* p. 33 (1862), and *Verth. Schildkr.* p. 91 (1865).

*Chelopus areolatus*, *Cope, Proc. Ac. Philad.* 1865, p. 186, and 1866, p. 123.

Head brown above; an oblique light band from the frontal region to above the ear, continued along the neck; a second pair of light bands along the neck, originating on the occiput; sides of head, fore

limbs, and lower surface of hind limbs light, spotted or lineolated with black.

Guatemala.

a. ♀, spir.

Lake of Peten.

O. Salvin, Esq. [C.].

### Var. *pulcherrima*.

*Emys pulcherrima*, Gray, *Cat. Sh. Rept.* i. p. 25, pl. xxv. fig. 1 (1855);

*Bocourt, Miss. Sc. Mex., Rept.* p. 15, pl. vii. fig. 1 (1870); *Günth.*

*Biol. C.-Am., Rept.* p. 6, pls. vii. & viii. fig. A (1885).

*Clemmys pulcherrima*, *Strauch, Chelon. Stud.* p. 32 (1862).

*Callichelys?* *pulcherrima*, Gray, *Ann. & Mag. N. H.* (3) xii. p. 181 (1863).

*Rhinoclemmys pulcherrima*, Gray, *Ann. & Mag. N. H.* (4) xi. p. 145 (1873).

— *bocourti*, Gray, *l. c.* p. 111.

*Chelopus pulcherrimus*, *Cope, Bull. U.S. Nat. Mus.* no. 32, p. 21 (1887).

Head olive above, with a narrow red streak round the upper part of the snout, terminating behind the supraciliary region; two others run from eye to eye below the preceding, and a fourth round the upper jaw; a longitudinal streak of the same colour on the frontal region, and some spots on the occiput; upper surface of neck with four (*Bocourt*) or five parallel red, black-edged, longitudinal streaks. Fore limbs and lower surface of hind limbs black and red. Shields of the carapace with curved yellowish dark-edged markings.

Mexico.

a. Yg., stfld.

Mexico.

(Type.)

b-d. ♀ & yg., spir.

Presidio.

Mr. Forrer [C.].

### Var. *incisa*.

*Emys incisa*, *Bocourt, Ann. Sc. Nat.* x. p. 121 (1868), and *Miss. Sc. Mex., Rept.* p. 11, pls. i. & ii. (1870); *Günth. Biol. C.-Am., Rept.* p. 7 (1885).

*Rhinoclemmys frontalis*, Gray, *Ann. & Mag. N. H.* (4) xi. p. 144 (1873).

*Chelopus incisus*, *Bocourt, Journ. de Zool.* v. p. 387 (1876); *Sumichrast, Bull. Soc. Zool. France*, 1880, p. 165.

Head and neck olive above; a fine red streak round the upper part of the snout and extending to above the ear; two others from eye to eye, below the preceding and above the nostrils, and a fourth round the upper jaw; sometimes a longitudinal streak of the same colour on the frontal region and another along each side of the neck. Fore limbs and lower surface of hind limbs black and red. Shields of the carapace sometimes with curved yellowish dark-edged streaks or ocelli.

Mexico.



|                      |                      |                                 |
|----------------------|----------------------|---------------------------------|
| <i>a.</i> ♀, spir.   | Tapana, Tehuantepec. | F. Sumichrast [C.].             |
| <i>b-c.</i> ♂, spir. | Tonala, Chiapas.     | F. Sumichrast [C.].             |
| <i>d.</i> ♀, stfid.  | — ?                  | (Type of <i>R. frontalis</i> .) |

*Chelopus funereus*, Cope, Journ. Ac. Philad. (2) viii. 1876, p. 154, from Limon, Costa Rica, may probably likewise be regarded as a variety of *N. punctularia*. It is based on young specimens, and the adult will probably be found to be of very obscure colour. The head and neck black above, without any markings.

#### 4. *Nicoria gabbii*.

*Chelopus gabbii*, Cope, Journ. Ac. Philad. (2) viii. p. 153 (1876).

Form resembling *Testudo*, stout, and with short thick feet with very short webs. Top of shell flat in profile, bearing a well-marked but obtuse keel. Vertebral shields broader than long in the adult, the last one the largest of all. Plastron strongly notched behind and concavely truncate in front. Snout nearly vertical, beak not notched. Hind leg with a row of large scales on the inner front of the lower half of the tibia, continuous with those covering the inner toe. Colour above wood-brown, middle of plastron darker brown, remainder of lower surfaces wax-yellow. A faint red band round the snout and a short one on the median line above; a yellowish, brown-edged band from the temple to the side of the neck, and a similar one from the eye to the tympanum; neck and limbs yellowish, speckled with brown and black; hind limbs blackish on the outer side.

Length of carapace 186 millim.

Costa Rica.

#### 5. *Nicoria annulata*.

*Geoclemmys annulata*, Gray, Proc. Zool. Soc. 1860, p. 231, pl. xxix.  
*Clemmys annulata*, Strauch, Chelon. Stud. p. 32 (1862), and Verth. Schildkr. p. 82 (1865).

*Rhinoclemmys annulata*, Gray, Ann. & Mag. N. H. (3) xii. p. 183 (1863), and Suppl. Cat. Sh. Rept. i. p. 29 (1870).

*Chelopus annulatus*, Cope, Proc. Ac. Philad. 1865, p. 186.

Habit of a *Testudo*. Shell not much depressed, unicarinate. Vertebral shields constantly much broader than long, nearly as broad as the costals; nuchal small. Plastron large; the width of the bridge exceeds the length of the posterior lobe, which is angularly emarginate; front lobe truncate or openly emarginate anteriorly. Axillary and inguinal shields present, very small. Head rather small; snout but feebly projecting; upper jaw slightly hooked, not notched; the width of the mandible at the symphysis is much less than the horizontal diameter of the orbit. No trace of web between the digits. Tail not longer than the head. Carapace brown, uniform or variegated with yellowish; plastron dark brown,

with a broad yellow border. Head yellowish above, variegated with blackish; neck and sides of head with pale and dark bands or variegations.

Length of shell 20 centim.

Western South America.

|                    |                      |                     |            |
|--------------------|----------------------|---------------------|------------|
| a. Hgr., spir.     | Esmeraldas, Ecuador. | Mr. Fraser [C.].    | } (Types.) |
| b, c. ♂ ♀, shells. | Esmeraldas, Ecuador. | Mr. Fraser [C.].    |            |
| d. ♀, stfid.       | Mendoza.             |                     |            |
| e. ♂, skel.        | —?                   | Zoological Society. |            |

## 6. *Nicoria rubida*.

*Chelopus rubidus*, Cope, *Proc. Am. Phil. Soc.* xi. 1869, p. 148 (1870).

*Geoclemmys rubida*, Gray, *Suppl. Cat. Sh. Rept.* p. 28 (1870).

*Rhinoclemmys mexicana*, Gray, *l. c.* p. 30, and *Proc. Zool. Soc.* 1870, p. 659, fig., and 1871, p. 296, pl. xxviii.

*Chelopus mexicanus*, Bocourt, *Journ. de Zool.* v. p. 387 (1876); *Sumichrast*, *Bull. Soc. Zool. France*, 1880, p. 166.

*Emys rubida*, Günth. *Biol. C.-Am., Rept.* p. 8, pl. viii. fig. C (1885).

Habit of a *Testudo*. Shell moderately depressed, with a mere trace of a keel. Vertebral shields constantly much broader than long, nearly as broad as the costals; nuchal small, sometimes absent. Plastron large; the width of the bridge exceeds the length of the posterior lobe, which is angularly emarginate; front lobe truncate or openly emarginate anteriorly. Axillary and inguinal shields present, small; the suture between the pectoral and abdominal shield on each side forming a strong curve. Head moderately large, with short vertically truncate snout; upper jaw feebly hooked, not notched; the width of the mandible at the symphysis equals the horizontal diameter of the orbit. No trace of web between the digits. Tail not longer than the head. Carapace olive or brownish, with a central ocellus and concentric yellowish lines on each shield, these markings becoming more indistinct in the adult; plastron with broad yellow border, dark brown in the middle and on a band across the bridge. Head and neck above pale brown, with large, rather variable, bands and rings of red (yellow in spirit), edged with blackish; a large, horseshoe-shaped band on the crown; limbs yellowish, with black and red markings.

Length of shell 15 centim.

Mexico.

|                        |                      |                     |                                      |
|------------------------|----------------------|---------------------|--------------------------------------|
| a. ♀, stfid.           | San Juan del Rio.    | M. Rébouch [C.].    | } (Types of<br><i>R. mexicana</i> .) |
| b, c. ♀ & yg., shells. | San Juan del Rio.    | M. Rébouch [C.].    |                                      |
| d, e, f. ♂ ♀, spir.    | Tapana, Tehuantepec. | F. Sumichrast [C.]. |                                      |
| g. ♀, shell.           | Tapana, Tehuantepec. | F. Sumichrast [C.]. |                                      |

## 15. CYCLEMYS.

*Terrapene*, part., *Merrem. Tent.* p. 27 (1820); *Bell, Zool. Journ.* ii. p. 308 (1825); *Fitzing. N. Classif. Rept.* p. 6 (1826); *Strauch, Chelon. Stud.* p. 25 (1862).

*Kinosternon*, part., *Bell, l. c.* p. 302.

*Sternotherus*, part., *Bell, l. c.* p. 305.

*Emys*, part., *Wagler, Syst. Amph.* p. 138 (1830); *Strauch, l. c.* p. 27.

*Cistudo*, part., *Gray, Syn. Rept.* p. 17 (1831); *Dum. & Bibr.* ii. p. 207 (1834); *Gray, Cat. Tort.* p. 29 (1844).

*Cyclemys*, *Bell, Proc. Zool. Soc.* 1834, p. 117; *Gray, Cat. Sh. Rept.* i. p. 42 (1855); *Günth. Rept. Brit. Ind.* p. 15 (1864); *Gray, Suppl. Cat. Sh. Rept.* i. p. 22 (1870).

*Cuora*, *Gray, Cat. Sh. Rept.* i. p. 41; *Günth. l. c.* p. 11; *Gray, Suppl.* p. 21.

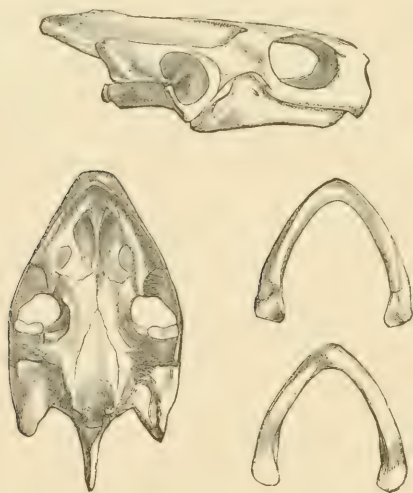
*Pyxidea*, *Gray, Proc. Zool. Soc.* 1863, p. 175; *Günth. l. c.* p. 16; *Gray, Suppl.* p. 20.

*Cistoclemmys*, *Gray, ll. cc.*

*Pyxiclemmys*, *Gray, ll. cc.* pp. 176, 20.

*Notochelys*, *Gray, ll. cc.* pp. 177, 21; *Günth. l. c.* p. 17.

Fig. 36.

Skull of *Cyclemys amboinensis*. (From Gray, P.Z. S. 1869.)

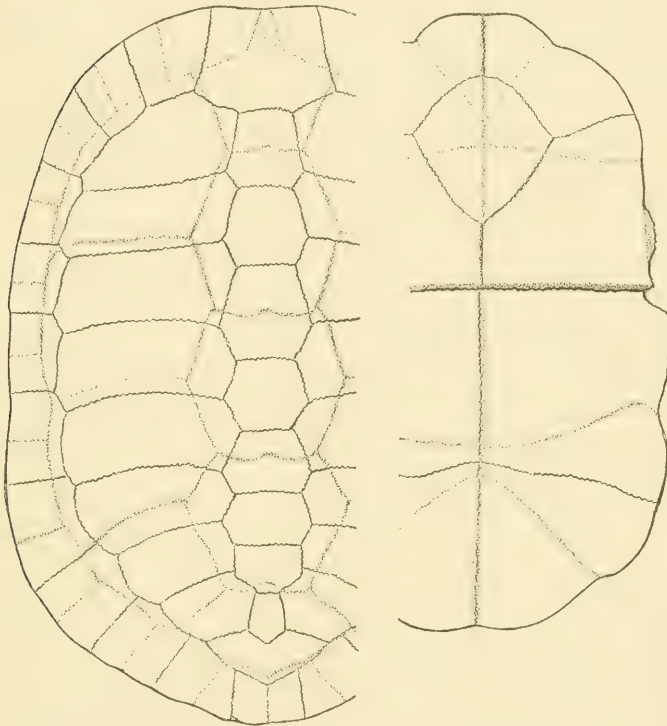
Neural plates mostly hexagonal, short-sided behind. Plastron united to carapace by ligament, and more or less distinctly divided, in the adult, into two lobes moving upon a ligamentous hinge between the hyo- and the hypoplastra; both the latter bones contributing to the formation of the bridge; entoplastron intersected by the humero-pectoral suture. Skull with a bony temporal arch;

alveolar surfaces without median ridge; choanæ between the eyes. Upper surface of head covered with undivided skin. Digits webbed or nearly free. Tail short, not longer in the young than in the adult.

East Indies, Southern China.

This genus stands in the same relation to *Nicoria* as *Emys* does to *Clemmys*.

Fig. 37.



Shell of *Cyclemys amboinensis*.

*Synopsis of the Species.*

- I. Plastron not completely closing the skull, emarginate posteriorly ;  
posterior margin of carapace serrated.

The suture between the pectoral shield  
and the marginals longer than that  
between the abdominal and the mar-  
ginals ; a large inguinal shield, and  
six vertebrales .....

1. *platynota*, p. 130.

- The suture between the pectoral and the marginals shorter than that between the abdominal and the marginals; carapace unicarinate ..... 2. *dhor*, p. 131.
- The suture between the pectoral and the marginals shorter than that between the abdominal and the marginals; carapace tricarinate ..... 3. *mouhotii*, p. 132.
- II. Plastron nearly completely closing the shell in the adult; carapace tricarinate in the young; posterior margin not serrated.
- Hind lobe of plastron angularly notched ..... 4. *trifasciata*, p. 133.
- Plastron not notched; digits distinctly webbed..... 5. *amboinensis*, p. 133.
- Plastron not notched; digits without distinct web ..... 6. *flavomarginata*, p. 135.

### 1. *Cyclemys platynota*.

*Emys platynota*, Gray, *Proc. Zool. Soc.* 1834, p. 54, and *Ill. Ind. Zool.* ii. pl. lvii. fig. 1 (1834), and *Cat. Tort.* p. 16 (1844); *Strauch, Verh. Schildkr.* p. 57 (1865).

*Cyclemys platynota*, Gray, *Cat. Sh. Rept.* i. p. 43 (1855).

*Notochelys platynota*, Gray, *Proc. Zool. Soc.* 1863, p. 177; *Günth. Rept. Brit. Ind.* p. 17 (1864); Gray, *Suppl. Cat. Sh. Rept.* i. p. 21 (1870).

*Cyclemys dentata* (*non* Gray), *Giebel, Zeitschr. f. ges. Naturw.* xxvii. p. 15, pl. iii. (1866).

*Geomyda grandis*, part., Gray, *Suppl. Cat. Sh. Rept.* i. p. 26.

*Cyclemys giebelii*, *Hubrecht, Notes Leyd. Mus.* iii. p. 45 (1881).

Carapace depressed, angular, the vertebral region flat, with an interrupted obtuse keel; posterior margin serrated; six, rarely seven, vertebral shields, the small additional shield intercalated between the fourth and fifth; vertebrals much broader than long, at least as broad as the costals; first vertebral broader than long and somewhat narrower than second. Plastron narrower than the opening of the shell, hind lobe openly emarginate, connected with the carapace by a distinct bridge, the width of which is contained twice and a half to twice and two thirds in the length of the plastron; the hyo- and hypoplastral bones contribute to an equal degree to the formation of the bridge; no distinct transverse hinge; a large inguinal shield; the suture between the pectoral shield and the marginals longer than that between the abdominal and the marginals; the median suture between the pectoral shields as long as or a little longer than that between the abdominals. Hook of the upper jaw bicuspid, divided by a median groove. Digits extensively webbed, claws long, curved, sharp. Front part of arm with broad, band-like transverse shields. Carapace reddish brown, or yellowish brown with radiating brown lines; young with a pair of round black spots on each vertebral shield, and one or two similar



spots on each costal; plastron yellow with brown spots, or brown with the sutures between the shields yellow. Head yellowish brown; neck brown, with irregular yellowish streaks, the broadest of which extends from the posterior corner of the eye.

Length of shell 24 centim.

Sumatra, Borneo, Malay Peninsula, Mergui.

|                           |            |                                             |
|---------------------------|------------|---------------------------------------------|
| a. Ad., stffd.            | Sumatra.   | (Type.)                                     |
| b. Yg., spir.             | Banka.     | Dr. Bleeker ( <i>Cistudo bankanensis</i> ). |
| c-e. Hgr. & yg., spir.    | Sarawak.   | A. Everett, Esq. [C.].                      |
| f, g, h. Ad., stffd.      | Singapore. | A. R. Wallace, Esq. [P.].                   |
| i, k. Hgr. & yg., shells. | Singapore. | A. R. Wallace, Esq. [P.].                   |

## 2. *Cyclemys dhor*.

*Emys dhor*, part., Gray, *Syn. Rept.* p. 23 (1831).

*Cyclemys orbiculata*, Bell, *Proc. Zool. Soc.* 1834, p. 17, and *Mon. Test.* p. —, pls. xxiv., xxv. (1842); Gray, *Proc. Zool. Soc.* 1863, p. 178; *Theob. Journ. Linn. Soc.* x. p. 12 (1870).

*Emys dentata*, Gray, *Ill. Ind. Zool.* ii. pl. lviii. fig. 2 (1834).

*Cistudo diardii*, Dum. & Bibr. ii. p. 227 (1835).

— *dentata*, Gray, *Cat. Tort.* p. 32 (1844).

*Emys diardii*, Schleg. *Verhand. Natuurk. Afbeeld.* p. 44, figs. 6 & 7 (1849).

*Cyclemys dentata*, Gray, *Cat. Sh. Rept.* i. p. 42, pl. xix. (1855); Jerdon, *Proc. As. Soc. Beng.* 1870, p. 68; *Theob. Cat. Rept. Brit. Ind.* p. 8 (1876).

*Emys dhor*, Strauch, *Chelon. Stud.* p. 28 (1862), and *Verth. Schildkr.* p. 58 (1865).

*Cyclemys oldhamii*, Gray, *Proc. Zool. Soc.* 1863, p. 178; Günth. *Rept. Brit. Ind.* p. 15, pl. v. fig. B (1864); Gray, *Suppl. Cat. Sh. Rept.* i. p. 23 (1870).

— *ovata*, Gray, *Proc. Zool. Soc.* 1863, p. 178, and *Suppl. Cat. Sh. Rept.* i. p. 23.

— *bellii*, Gray, *Proc. Zool. Soc.* 1863, p. 179.

*Cistudo orbiculata*, Giebel, *Zeitschr. f. ges. Naturw.* xxvii. p. 13 (1866).

*Cyclemys dhor*, Gray, *Suppl. Cat. Sh. Rept.* i. p. 23.

Carapace depressed, with a single, obtuse keel; posterior margin serrated; vertebral shields as broad as long or broader than long, narrower than the costals. Plastron narrower than the opening of the shell, hind lobe angularly notched, connected with the carapace by a distinct bridge, the width of which is contained twice and three fourths to three times in the length of the plastron; the hyo- and hypoplastral bones contribute to a nearly equal degree to the formation of the bridge; the transverse hinge between the hyo- and hypoplastrals, which does not correspond with the curved suture between the pectoral and abdominal shields, is only developed in adult specimens; a small inguinal shield may be present; the suture between the pectoral shield and the marginals shorter than that between the abdominal and the marginals; the longest median suture is that between the pectorals. Hook of upper jaw bicuspid.

Digits distinctly webbed, with sharp claws. Front part of arm with broad transverse scales. Carapace brown, or yellowish brown spotted with dark brown; plastron yellowish or pale brown in the young, with dark brown spots or radiating lines; in the adult dark brown. Neck with dark and light longitudinal lines.

Length of shell 19 centim.

Malay Archipelago and Peninsula, Camboja, Siam, Burma, N. India.

|                                              |                    |                                               |
|----------------------------------------------|--------------------|-----------------------------------------------|
| a. Ad., skel.                                | Java.              | Leyden Museum.                                |
| b. Yg., spir.                                | Java.              | Leyden Museum.                                |
| c. Yg., spir.                                | Java.              | T. Bell, Esq. [P.].                           |
| d. Ad., skel.                                | Java?              |                                               |
| e, f. Yg., spir.                             | Sarawak.           | A. Everett, Esq. [C.].                        |
| g. Ad., shell.                               | Sarawak.           | A. R. Wallace, Esq. [P.].                     |
|                                              |                    | (Type of <i>C. ovata</i> .)                   |
| h. Yg., dry.                                 | Sarawak.           | A. R. Wallace, Esq. [P.].                     |
| i. Yg., spir.                                | Malay Archipelago. | Dr. Bleeker.                                  |
| k. Yg., stfld.                               | Lao Mountains.     | M. Mouhot [C.].                               |
| l. Ad., stfld.                               | Lao Mountains.     | M. Mouhot [P.].                               |
| m. Ad., shell.                               | Mergui.            | Prof. Oldham } of <i>C. oldhami</i> .<br>[P.] |
| n-o. Yg., spir.                              | Pegu.              | W. Theobald, Esq. [C.].                       |
| p. Yg., skel.                                | Pegu.              | W. Theobald, Esq. [C.].                       |
| q-r. Hgr. & yg., shells.                     | Pegu.              | W. Theobald, Esq. [C.].                       |
| s. Hgr., stfld.                              | — ?                | Sir A. Smith [P.].                            |
| t, u. Yg., shells.                           | — ?                |                                               |
| v. Ad., carapace and front lobe of plastron. | — ?                |                                               |

### 3. *Cyclemys mouhotii*.

*Cyclemys mouhotii*, Gray, *Ann. & Mag. N. H.* (3) x. p. 157 (1862).  
*Pyxidea mouhotii*, Gray, *Proc. Zool. Soc.* 1863, p. 175; *Günth. Rept. Brit. Ind.* p. 16, pl. iv. fig. D (1864); Gray, *Suppl. Cat. Sh. Rept. i.* p. 20 (1870); *Jerdon, Proc. As. Soc. Beng.* 1870, p. 68; *Theob. Cat. Rept. Brit. Ind.* p. 9 (1876).  
*Emys mouhotii*, *Strauch, Verth. Schölk. p.* 57 (1865).

Carapace depressed, angular, the vertebral region flat, with three strong parallel keels; posterior margin serrated; vertebral shields much broader than long and as broad as the costals; first vertebral as long as broad or broader than long, narrower than second. Plastron a little narrower than the opening of the shell, hind lobe angularly emarginate; bridge broad and very short, its width about one third the length of the plastron; the hypoplastral bone and the abdominal shield have a much greater share in the formation of the bridge than the hyoplastral and pectoral; the longest median suture is that between the abdominals. Hook of the upper jaw strong, entire. Digits nearly free; limbs covered with large scales. Carapace yellowish or reddish brown; plastron yellowish, with or without a few large dark brown spots; neck of young brown, spotted with yellow.

Length of shell 16 centim.

Siam, Cochin China, Cachar.



fig. 2 (1835); *Gray, Cat. Tort.* p. 30 (1844); *Giebel, Zeitschr. f. ges. Naturw.* xxvii. p. 11 (1866).

*Cuora amboinensis*, *Gray, Cat. Sh. Rept.* i. p. 41 (1855); *Günth. Rept. Brit. Ind.* p. 12, pl. iv. figs. A, B (1864); *Gray, Suppl. Cat. Sh. Rept.* i. p. 21 (1870), and *Append.* p. 10 (1872); *Theob. Cat. Rept. Brit. Ind.* p. 7 (1876).

Carapace depressed and tricarinate in the young, usually very convex and without or with a single keel in adult females; vertebral shields as long as broad or a little longer than broad in the adult, broader in the young, much narrower than the costals. Plastron as large as the opening of the shell in the adult, without distinct bridge; no anal notch; the line of junction between the hyoplastron and the carapace shorter than that between the hyoplastron and the carapace; pectoral shields as long as or shorter than the abdominals, as long as or slightly longer than the humerals; axillary and inguinal small or absent. Head rather small; upper jaw scarcely hooked, without any emargination. Front part of arm with large transverse scales. Digits moderately webbed, with sharp claws. Carapace brown or blackish; plastron yellow with large black spots, or dark brown with the suture between the shields yellow; in the very young the black spots of the plastron are confluent into a broad longitudinal zone, the borders of the plastron being yellowish; head and neck brown above, yellow inferiorly; a yellow band borders the head and neck superiorly, meeting its fellow above the nostrils; a second yellow band passes through the eye and is separated from the upper jaw by a dark brown band: ear yellow.

Length of shell 20 centim.

Burma, Siam, Malay Peninsula and Archipelago eastwards to the Moluccas.

|                                          |                 |                           |
|------------------------------------------|-----------------|---------------------------|
| a. ♀, stf'd.                             | Siam.           |                           |
| b. ♀, stf'd.                             | Malacca.        | Capt. Ince [P.].          |
| c. Hgr., stf'd.                          | Singapore.      |                           |
| d, e, f, g. ♀, hgr., & yg., spir.        | Borneo.         | Dr. Bleeker.              |
| h. Yg., spir.                            | Borneo.         | A. R. Wallace, Esq. [C.]. |
| i, k. Hgr. & yg., spir.                  | Philippines.    | H. Cuming, Esq. [C.].     |
| l-m. Hgr., spir.                         | Laguna del Bey. | Dr. A. B. Meyer [C.].     |
| n. Several specs., ♀, hgr., & yg., spir. | Dinagat Id.     | A. Everett, Esq. [C.].    |
| o. Yg., spir.                            | N. Celebes.     | Dr. A. B. Meyer [C.].     |
| p. ♂, skel.                              | Manado.         |                           |
| q. ♂, stf'd.                             | Gilolo.         |                           |
| r. ♀, spir.                              | Amboyna.        | Leyden Museum.            |
| s. ♀, skel.                              | Amboyna.        | Leyden Museum.            |
| t. ♂, stf'd.                             | —?              | T. Bell, Esq. [P.].       |
| u. Yg., shell.                           | —?              | J. E. Gray, Esq. [P.].    |
| v. Hgr., stf'd.                          | —?              |                           |
| w, x. ♂, skels.                          | —?              |                           |
| y. ♀, shell.                             | —?              |                           |

6. *Cyclemys flavomarginata*.

*Cuora trifasciata*, part., *Gray, Cat. Sh. Rept.* i. p. 42 (1855).

*Cistoclemmys flavomarginata*, *Gray, Proc. Zool. Soc.* 1863, p. 175, and *Ann. & Mag. N. H.* (3) xiii. p. 107 (1864), and *Suppl. Cat. Sh. Rept.* i. p. 20 (1870).

*Cuora flavomarginata*, *Günth. Rept. Brit. Ind.* p. 13, pl. v. fig. A (1864).

*Terrapene flavomarginata*, *Strauch, Verh. Schildkr.* p. 48 (1865).

Carapace rather convex, without or with a very obtuse median keel; vertebral shields as long as broad or a little broader than long, much narrower than the costals, first narrower than second. Plastron as large as the opening of the shell, rounded at both ends; no bridge; the hinge between the hyoplastron and the carapace much shorter than that between the hypoplastron and the carapace; pectoral shields as long as or a little longer than the humerals, and a little shorter than the abdominals; gular and anal shields more or less completely coalesced. Upper jaw rather strongly hooked. Digits without distinct web, with blunt claws. Front part of arm with very large scales. Carapace dark brown, each shield lighter brown in the centre; plastron dark brown, with an irregular narrow yellow edge. Jaws and cheeks yellowish; a bright yellow streak, edged with dark brown, narrow in front and broad behind, extends from the eye to the nape; upper surface of head pale brownish.

Length of shell 17 centim.

Formosa.

|               |                   |                      |          |
|---------------|-------------------|----------------------|----------|
| a. ♀, stffld. | Tamsuy, N.W. For- | R. Swinhoe, Esq. )   | (Types.) |
|               | mosa.             | [C.]                 |          |
| b. ♀, stffld. | China?            | J. R. Reeves, Esq. ) |          |
|               |                   | [P.]                 |          |

16. *GEOEMYDA*.

*Geoemyda*, part., *Gray, Proc. Zool. Soc.* 1834, p. 100, and *Cat. Tort.* p. 14 (1844).

*Emys*, part., *Dum. & Bibr.* ii. p. 232 (1834).

*Geoemyda*, *Gray, Cat. Sh. Rept.* i. p. 16 (1855); *Günth. Rept. Brit. Ind.* p. 18 (1864); *Gray, Suppl. Cat. Sh. Rept.* i. p. 25 (1870); *Anders. Zool. Res. Yunnan*, p. 716 (1879).

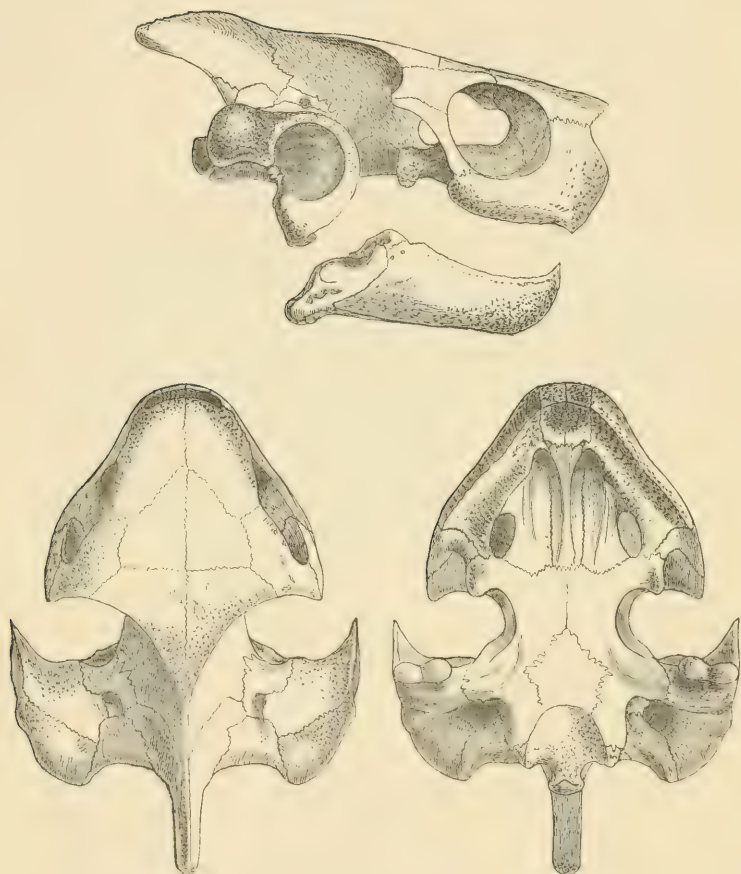
*Clemmys*, part., *Strauch, Chelon. Stud.* p. 28 (1862).

Neural plates mostly hexagonal, short-sided behind. Plastron extensively united to the carapace by suture, with axillary and inguinal peduncles just reaching the first and fifth costals; entoplastron intersected by the humero-pectoral suture. Skull without bony temporal arch; alveolar surfaces narrow, without median ridge. Upper surface of head covered with undivided skin. Digits with a short web. Tail very short, not longer in the young than in the adult.

Burma, Malay Peninsula and Archipelago.



Fig. 38.

Skull of *Geoemyda grandis*.*Synopsis of the Species.*

- I. Anterior margin of shell serrated ; second vertebral shield at least as broad as the second costal, much broader than long . . 1. *spinosa*, p. 137.
- II. Anterior margin of shell not serrated ; second vertebral shield narrower than the second costal, not much broader than long.
- Carapace arched or tectiform in a transverse section . . . . . 2. *grandis*, p. 138.
- Carapace much depressed, flat on the vertebral region . . . . . 3. *depressa*, p. 139.

1. *Geoemyda spinosa*.

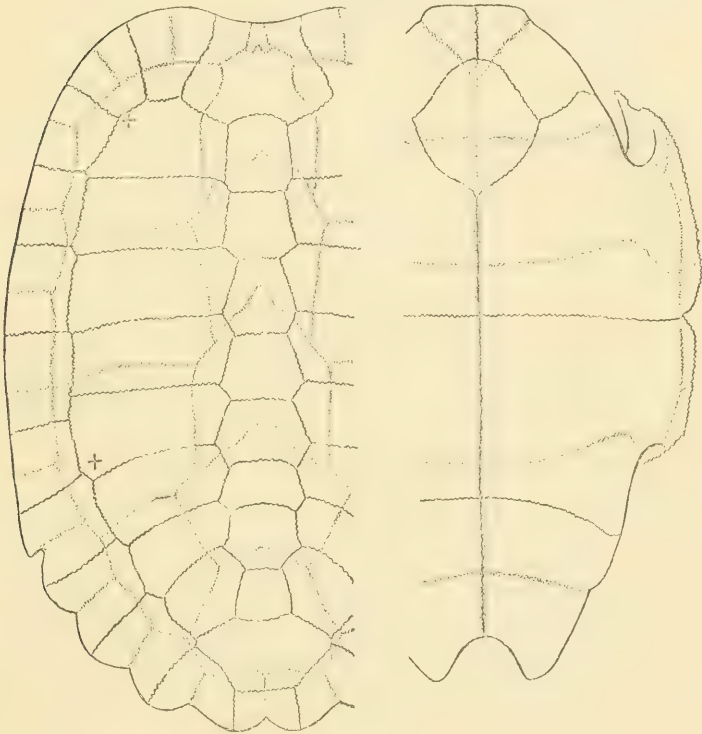
*Emys spinosa*, Gray, *Syn. Rept.* p. 20 (1831), and *Ill. Ind. Zool.* i. pl. lxxvii. figs. 1, 2 (1832); *Bell, Mon. Test.* p. —, pls. xxvi. & xxvii. (1834); *Dum. & Bibr.* ii. p. 327 (1834).

*Geoemyda spinosa*, Gray, *Proc. Zool. Soc.* 1834, p. 100, and *Ill. Ind. Zool.* ii. pl. lvii. fig. 2 (1834), and *Cat. Tort.* p. 14 (1844), and *Sh. Rept.* i. p. 16 (1855); *Günth. Rept. Brit. Ind.* p. 18 (1864); *Theob. Cat. Rept. Brit. Ind.* p. 5 (1876).

*Clemmys spinosa*, *Strauch, Chelon. Stud.* p. 32 (1862), and *Verth. Schildkr.* p. 63 (1865).

Carapace of adult much depressed, with broad flat vertebral

Fig. 39.

Shell of *Geoemyda grandis*.

region and an uninterrupted obtuse keel; anterior and posterior margin serrated; of young more regularly arched, with a short keel or spinose tubercle on each costal shield, and the border strongly serrated all round, each marginal being produced in a spine, with or without smaller denticulation on each side; the vertebral keel stronger than in the adult. Vertebral shields (2-4)

much broader than long, at least as broad as the costals; nuchal shield longer than broad. Plastron large; the width of the bridge about equals the length of the posterior lobe, which is angularly emarginate; as regards size, the plastral shields take the following order, commencing with the largest:—abdominals, pectorals, femorals, humerals, anals, gulars; the suture between the abdominals not or but slightly longer than that between the pectorals; axillary and inguinal shields present. Upper jaw bicuspid. Carapace brown above, reddish in the young, the vertebral keel lighter; each plastral shield with yellow and dark brown radiating streaks; soft parts dark brown, with a yellowish spot on each side of the neck, near the ear.

Length of carapace 20 centim.

Burma, Malay Peninsula, Sumatra, Borneo.

|                       |             |                           |
|-----------------------|-------------|---------------------------|
| a. Yg., shell.        | Tenasserim. | W. Theobald, Esq. [E.].   |
| b. ♂, stfid.          | Pinang.     | Dr. Cantor.               |
| c. Yg., stfid.        | Pinang.     |                           |
| d, e. ♂ & yg., stfid. | Singapore.  | A. R. Wallace, Esq. [C.]. |
| f. ♀, stfid.          | Sumatra.    | A. R. Wallace, Esq. [C.]. |
| g. Hgr., shell.       | Sumatra.    | A. R. Wallace, Esq. [C.]. |
| h. ♂, spir.           | Sumatra.    | Hr. C. Bock [C.].         |
| i. Yg., spir.         | Sumatra.    | Leyden Museum.            |
| k. ♂, stfid.          | Sumatra.    |                           |
| l. Hgr., spir.        | Sarawak.    | A. Everett, Esq. [C.].    |
| m. Yg., spir.         | Borneo.     |                           |

## 2. *Geoemyda grandis*.

*Geoemyda grandis*, Gray, *Ann. & Mag. N. H.* (3) vi. p. 218 (1860);  
*Günth. Rept. Brit. Ind.* p. 19, pls. i. & ii. figs. A & B (1864);  
 Gray, *Suppl. Cat. Sh. Rept.* i. p. 25 (1870); *Theob. Cat. Rept. Brit. Ind.* p. 5 (1876).

*Clemmys grandis*, *Strauch, Chelon. Stud.* p. 32 (1862).

Carapace arched or tectiform, not flattened on the vertebral region, which bears a strong but obtuse keel; only the posterior margin serrated. Vertebral shields (1-3) not or but slightly broader than long and narrower than the costals; nuchal longer than broad. Plastron similar to that of *G. spinosa*; the length of the suture between the pectoral shields at least two thirds that of the abdominals. Dark brown or blackish above; plastron and lower surface of marginals with black and yellow rays, either the black or the yellow predominating.

Length of carapace 40 centim.

Burma, Siam.

|                       |            |                         |            |
|-----------------------|------------|-------------------------|------------|
| a, b. ♂ & yg., stfid. | Camboja.   | M. Mouhot [C.].         | } (Types.) |
| c. Hgr., stfid.       | Pachobone. | M. Mouhot [C.].         |            |
| d, e. ♂ ♀, shells.    | Pegu.      | W. Theobald, Esq. [C.]. |            |
| f. Egg.               | Burma.     | W. Theobald, Esq. [C.]. |            |
| g. ♀, skel.           | Burma.     |                         |            |
| h. Carapace.          | — ?        |                         |            |

3. *Geoemyda depressa*.

*Geoemyda depressa*, *Anders. Ann. & Mag. N. H.* (4) xvi. p. 284 (1875), and *Zool. Res. Yunnan*, p. 721, pls. lv., lvi., & lxxv. B. figs. 1-5 (1879).

— *arakana*, *Theob. Cat. Rept. Brit. Ind.* p. vii (1876).

Shell much depressed, the depression increasing from before backwards, the shell being somewhat expanded across the inguinal region; only the posterior border serrated; second vertebral about as long as broad, narrower than the costals; nuchal longer than broad. Plastral shields as in *G. spinosa* and *G. grandis*. Carapace light brown; plastron and lower surface of marginals yellow, the plastral shields with a few broad black rays; the interval between the axillary and inguinal notches black. Head leaden, neck pale yellowish brown; limbs of the latter colour, with the large scales dark, almost black.

Length of carapace 24 centim.

Aracan.

a. ♀, shell.

Aracan.

W. Theobald, Esq. [E.].

b. ♀, shell.

Aracan.

R. Lydekker, Esq. [E.].

The following genus requires further investigation :—

## CHAIBASSIA.

*Chaibassia*, *Theobald, Cat. Rept. Brit. Ind.* p. 6 (1876); *Anders. Zool. Res. Yunnan*, pp. 718, 720 (1879).

Characters of *Geoemyda*, but the hypoplastron is usually attached to the carapace by ligament\*, and a bony temporal arch is present. Feet not webbed. (*Anderson*.)

North-eastern India.

1. *Chaibassia tricarinata*.

*Geoemyda tricarinata*, *Blyth, Journ. As. Soc. Beng.* xxiv. p. 714 (1856); *Jerdon, Proc. As. Soc. Beng.* 1870, p. 69; *Gray, Suppl. Cat. Sh. Rept.* i. p. 26 (1870).

*Chaibassia tricarinata*, part., *Theob. l. c.*

— *tricarinata*, *Anders. l. c.* p. 718.

Carapace elongately oval, relatively highly arched, with three flat and obtuse ridges. A rather elongate nuchal shield. Plastron notched posteriorly. Hind foot rather club-shaped; claws large, hooked, and sharp; the two outer fore-claws small. Carapace dark reddish brown, the three ridges yellow; plastron pale yellow.

Length of carapace 14 centim.

Chaibassa, Bengal.

---

\* This character has been pointed out by Anderson, whose definition of the genus is, however, not very clear, especially owing to some lapsus in his description of the disposition of the "hyposternal process" abutting "against the first costal and third marginal." But as far as I can gather we have here a structure similar to that of the fossil *Ptychogaster*, one of the differences between the two genera being that the hypoplastra are more narrowed in the latter, and movable upon a transverse hinge.

2. *Chaibassia theobaldi*.

*Chaibassia tricarinata*, part., *Theob. l. c.*

— *theobaldi*, *Anders. l. c.* p. 718.

Distinguished from the preceding by the very much larger and anteriorly broader first vertebral, the lateral margins of which are widely anteriorly divergent. Facial portion of the head longer and more pointed. Shell black above, almost orange-yellow inferiorly, the dorsal ridges bright yellow; head black, with a broad reddish band from above each nostril, increasing in breadth as it passes over the eye and over the tympanum, where it ceases; a narrow similar band below the angle of the mouth, along the inferior margin of the lower jaw; neck and limbs blackish.

Length of shell 16 centim.

Bisthnath Plain, Assam.

## 17. CINIXYS.

*Kinixys*, *Bell, Tr. Linn. Soc.* xv. p. 398 (1827); *Wagl. Syst. Amph.*

p. 138 (1830); *Gray, Syn. Rept.* p. 15 (1831); *Dum. & Bibr. ii.*

p. 159 (1835); *Gray, Cat. Tort.* p. 11 (1844), and *Sh. Rept. i.*

p. 12 (1855); *Strauch, Chelon. Stud.* p. 24 (1862).

*Cinothorax*, *Fitzing. Ann. Wien. Mus.* i. p. 108 (1835).

Posterior portion of carapace movable in the adult, hinged between the seventh and eighth marginals and the fourth and fifth costal plates. Neural plates hexagonal, short-sided behind. Supracaudal shield undivided. Plastron extensively united to the carapace by suture, with short axillary and inguinal buttresses, which do not reach the costal plates; entoplastron anterior to the humero-pectoral suture. Skull with a bony temporal arch; alveolar surface without median ridge; beak hooked; choanæ between the eyes. Head shielded above. Limbs club-shaped, with blunt claws and large scales. Tail short, not longer in the young than in the adult.

Tropical Africa.

*Synopsis of the Species.*

I. Anterior and posterior margins of carapace reverted and dentated.

No nuchal shield; anterior extremity of  
plastron projecting beyond the carapace;  
posterior part of carapace sloping . . . . . 1. *erosa*, p. 141.

Nuchal present; anterior extremity of plastron  
not projecting beyond the carapace; cara-  
pace descending vertically behind . . . . . 2. *homeana*, p. 143.

II. Margin of carapace not reverted nor den-  
tated; nuchal shield present . . . . . 3. *belliana*, p. 143.



1. *Cinixys erosa*.

*Testudo denticulata* (*non L.*), *Shaw, Zool.* iii. p. 59, pl. xiii. (1802).

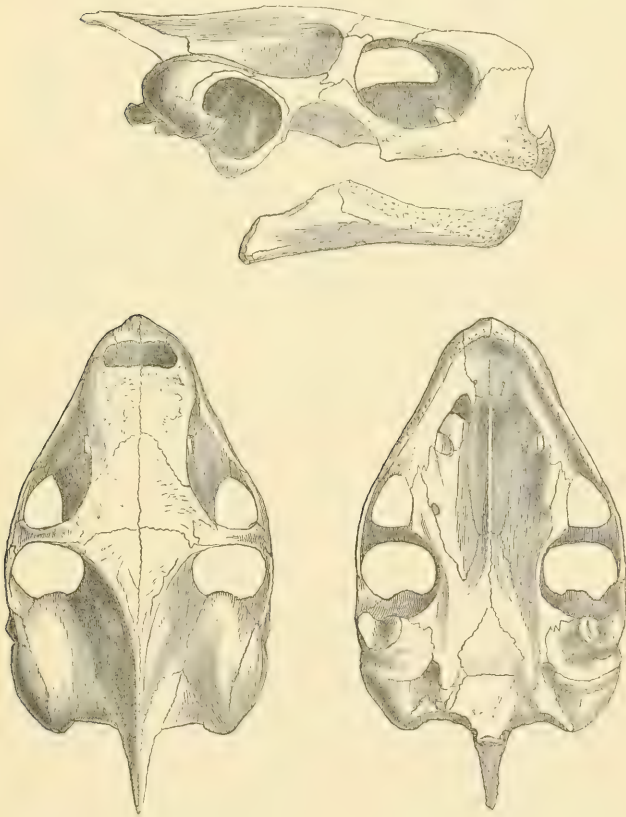
— *erosa*, *Schweigg. Prodr.* p. 52 (1814).

*Kinixys castanea*, *Bell, Tr. Linn. Soc.* xv. p. 398, pl. xvii. fig. 1 (1827).

— *erosa*, *Gray, Syn. Rept.* p. 16 (1831); *Dum. & Bibr.* ii. p. 165 (1835); *Gray, Cat. Tort.* p. 12 (1844), and *Sh. Rept.* i. p. 13 (1855), and *Proc. Zool. Soc.* 1863, p. 196; *Strauch, Chelon. Stud.* p. 39 (1865); *Gray, Suppl. Cat. Sh. Rept.* i. p. 14 (1870); *Boettg. Ber. Senckenb. Ges.* 1888, p. 12.

— *denticulata*, *Hallow. Journ. Ac. Philad.* viii. p. 161, pls. viii. & ix. (1839).

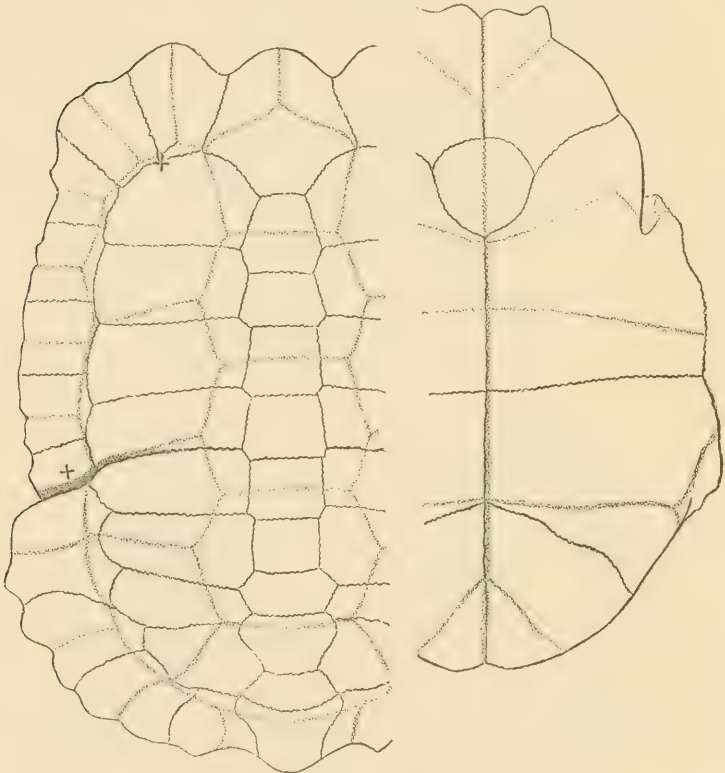
Fig. 40.

Skull of *Cinixys erosa*.

Anterior and posterior margins of carapace strongly reverted and dentated, serrated and spinose in the young; posterior profile of

carapace curved; anterior marginals much longer than the posterior; no nuchal shield; discal shields concentrically grooved; vertebral shields broader than the costals, fifth usually broader than the others. Plastron with very thick anterior lip, notched in front and projecting beyond the anterior border of the carapace; the length of the thickened anterior lip equals about one fourth of the length of the plastron in the female, more in the male; hind lobe of plastron very short, truncate, its length about half the width of the bridge;

Fig. 41.

Shell of *Cinixys erosa*.

the longest median suture is between the abdominal shields, which equals twice to thrice that between the pectorals; the smallest plastral shields are the anals; inguinal large, axillary small. Carapace dark brown, centre of shields lighter; outer side of costal shields yellowish; plastral shields dark brown in the centre, yellowish all round.

Length of shell 23 centim.

Guinea, Gaboon.

|                               |                         |                                                       |
|-------------------------------|-------------------------|-------------------------------------------------------|
| <i>a, b.</i> ♂ & yg., shells. | Gambia.                 |                                                       |
| <i>c.</i> Yg., spir.          | Aneober R., Gold Coast. | Capt. Burton & Lieut. Cameron [P.].                   |
| <i>d.</i> Yg., spir.          | Ashantee.               |                                                       |
| <i>e, f, g.</i> Yg., spir.    | Gaboon.                 |                                                       |
| <i>h, i, k.</i> ♂ ♀, stffid.  | W. Africa.              |                                                       |
| <i>l.</i> ♂, skel.            | W. Africa.              |                                                       |
| <i>m, n, o.</i> ♂ ♀, shells.  | W. Africa.              |                                                       |
| <i>p.</i> Hgr., shell.        | ——?                     | T. Bell, Esq. [P.].<br>(Type of <i>C. castanea</i> .) |

## 2. *Cinixys homeana*.

*Kinixys homeana*, Bell, *Tr. Linn. Soc.* xv. p. 400, pl. xvii. fig. 2 (1827); *Gray, Syn. Rept.* p. 15 (1831); *Dum. & Bibr.* ii. p. 161, pl. xiv. fig. 2 (1835); *Gray, Cat. Tort.* p. 11 (1844); *Berthold, N. Act. Ac. Leop.-Carol.* xxii. p. 423, pls. xliii.-xlv. (1850); *Gray, Cat. Sh. Rept.* i. p. 13 (1855), and *Proc. Zool. Soc.* 1863, p. 196; *Strauch, Verth. Schildkr.* p. 38 (1865); *Gray, Suppl. Cat. Sh. Rept.* i. p. 14 (1870).

Anterior and posterior margins of carapace strongly reverted and dentated, serrated and spinose in the young; posterior profile of carapace angulated, descending vertically from the anterior part of the fifth vertebral shield; anterior marginals much longer than posterior; a narrow nuchal shield; discal shields concentrically grooved; vertebral shields broader than costals. Plastron with very thick anterior lip, notched in front, but not projecting beyond the carapace; hind lobe of plastron very short, truncate, about half the width of the bridge; the longest median suture is between the abdominal shields, and equals about twice that between the pectorals; the smallest plastral shields are the anals; inguinal large, axillary small. Coloration as in the preceding.

Length of shell 20 centim.

Guinea, Gaboon.

|                           |                       |                                    |
|---------------------------|-----------------------|------------------------------------|
| <i>a, b.</i> ♂ ♀, shells. | Cape Coast, Ashantee. | Lieut. M. O. Friend,<br>R.N. [P.]. |
| <i>c.</i> ♀, skel.        | W. Africa.            |                                    |
| <i>d.</i> Yg., spir.      | ——?                   |                                    |

## 3. *Cinixys belliana*.

*Kinixys belliana*, *Gray, Syn. Rept.* p. 69 (1831); *Dum. & Bibr.* ii. p. 168 (1835); *Gray, Cat. Tort.* p. 12 (1844), and *Sh. Rept.* i. p. 13, pl. ii. (1855); *Strauch, Verth. Schildkr.* p. 40 (1865); *Blanf. Zool. Abyss.* p. 444 (1870); *Gray, Suppl. Cat. Sh. Rept.* i. p. 13 (1870); *Slater, Proc. Zool. Soc.* 1871, p. 544; *Peters, Reise n. Mossamb.* iii. p. 5 (1882).

—— *schoensis*, *Rüpp. Mus. Senckenb.* iii. p. 226, pl. xvi. (1845).

*Testudo geometrica* (non L.), *Bianconi, Spec. Zool. Mosamb.* p. 52, pl. vi. figs. 1 & 2 (1851).

*Kinixys spekii*, *Gray, Ann. & Mag. N. H.* (3) xii. p. 381 (1863), and *Suppl. Cat. Sh. Rept.* i. p. 14.

*Cinixys dorri*, *Lutaste, Le Natur.* x. pp. 164 & 228, figs. (1888).

Margin of carapace not reverted nor serrated, in the young as well as in the adult; a narrow nuchal shield; discal shields concentrically grooved; vertebral shields broader than costals. Plastron with thick anterior lip, which is truncate or very slightly notched anteriorly, and does not project, or projects but slightly, beyond the anterior border of the carapace; the length of the thickened anterior lip equals about one fifth the length of the plastron in the female and one fourth in the male; hind lobe very short, truncate or very openly notched, its length half or less than half the width of the bridge; the longest median suture is between the abdominal shields, which equals twice to four times that between the pectorals; the smallest shields are the gulars; inguinal large, axillary small. Carapace yellowish or pale olive, uniform or elegantly marked with black areolar and radiating bands; plastron yellow, uniform or with a few radiating black markings on each shield.

Length of shell 19 centim.

Tropical Africa.

|                         |                              |                                                    |
|-------------------------|------------------------------|----------------------------------------------------|
| a. ♀, stffid.           | Gambia.                      | J. Whitfield, Esq. [P.]                            |
| b. ♀, stffid.           | W. Africa ?                  | Dr. J. E. Gray [P.]<br>(Type.)                     |
| c, d. ♂ ♀, stffid.      | W. Africa.                   |                                                    |
| e. ♀, shell.            | W. Africa.                   |                                                    |
| f. ♀, shell, imperfect. | C. Africa.                   | Capt. Speke [P.]. (Type<br>of <i>C. spekkii</i> .) |
| g, h. ♀ & yg., stffid.  | Anseba Valley,<br>Abyssinia. | W. T. Blanford, Esq.<br>[P.].                      |
| i. ♀, dry.              | Anseba Valley,<br>Abyssinia. | W. Jesse, Esq. [C.].                               |
| k. Yg., spir.           | Kilimanjaro.                 | F. J. Jackson, Esq. [P.].                          |
| l. ♀, shell.            | Sandom.                      | Sir Samuel Baker [P.].                             |
| m. ♀, stffid.           | —— ?                         |                                                    |
| n. ♂, skel.             | —— ?                         |                                                    |
| o. ♂, spir.             | —— ?                         |                                                    |

## 18. PYXIS.

*Pyxis*, Bell, *Tr. Linn. Soc.* xv. p. 395 (1827); *Wagl. Syst. Amph.* p. 138 (1830); *Gray, Syn. Rept.* p. 16 (1831); *Dum. & Bibr.* ii. p. 155 (1835); *Gray, Cat. Tort.* p. 12 (1844), and *Sh. Rept.* i. p. 14 (1855); *Strauch, Chelon. Stud.* p. 23 (1862); *Gray, Suppl. Cat. Sh. Rept.* i. p. 12 (1870).

Neural plates alternately tetragonal and octagonal; costal plates very unequal in size, third, fifth, and seventh pointed distally; supracaudal shield undivided. Plastron extensively united to the carapace by suture, with short axillary and inguinal buttresses which do not reach the costal plates; front lobe hinged, movable; entoplastron anterior to the humero-pectoral suture. Skull with narrow bony postorbital and temporal arches; alveolar surface without median ridge; beak hooked; choanæ between the eyes.

Head shielded above. Limbs club-shaped, with blunt claws and large scales. Tail short.

Madagascar.

### 1. *Pyxis arachnoides*.

*Pyxis arachnoides*, *Bell, l. c.* pl. xvi.; *Dum. & Bibr. t. c.* p. 156, pl. xiv. fig. 1; *Gray, Cat. Tort.* p. 12, and *Sh. Rept.* p. 14; *Strauch, Verth. Schildkr.* p. 38 (1865); *Gray, Suppl.* p. 13, and *Proc. Zool. Soc.* 1873, pl. lx. fig. 7.

— *madagascariensis*, *Lesson, Bull. Sc. Nat.* xxv. p. 120 (1831).

? *Testudo planicauda*, *Grandid. Rev. et Mag. de Zool.* (2) xix. p. 233 (1867).

Shell hemispherical, all the shields with strong concentric grooves; margin not serrated; nuchal shield present, narrow; vertebral shields much broader than long, as broad as the costals. Front lobe of plastron narrower than hind lobe, truncate anteriorly, its length two thirds the width of the bridge; hind lobe short, openly notched posteriorly; median suture between the gulars, humerals, pectorals, and anals equal in length, half as long as that between the abdominals; suture between the femorals very short; inguinal large, axillary small. Shell yellow, with broad black bands of unequal width radiating from the centre of the dorsal shields; six such rays on each vertebral and four or five on each costal.

Length of shell  $10\frac{1}{2}$  centim.

Madagascar; Mauritius?

a. Ad., skel.

— ?

### 19. *HOMOPUS*.

*Testudo*, part., *Gray, Syn. Rept.* p. 8 (1831); *Strauch, Chelon. Stud.* p. 20 (1862).

*Homopus*, *Dum. & Bibr.* ii. p. 145 (1835); *Gray, Cat. Tort.* p. 10 (1844), and *Sh. Rept.* i. p. 11 (1855), and *Suppl.* p. 13 (1870).

*Chersobius*, *Fitzing. Ann. Wien. Mus.* i. p. 112 (1835).

Neural plates mostly hexagonal, anterior short-sided behind; costal plates alternately narrower and wider; supracaudal shield undivided. Plastron extensively united to the carapace by suture, with short axillary and inguinal buttresses, which do not reach the costal plates; entoplastron anterior to the humero-pectoral suture. Skull with weak bony postorbital and temporal arches; alveolar surface without median ridge; beak hooked; choanæ between the eyes. Head shielded above. Limbs club-shaped, covered with large scales. Tail short, not longer in the young than in the adult.

South and West Africa.



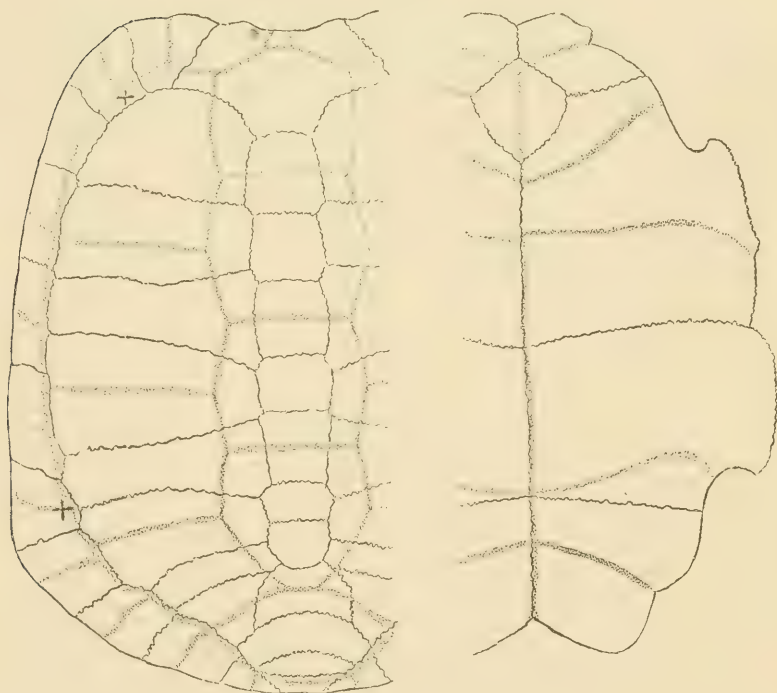
*Synopsis of the Species.*

## I. Carapace depressed, of equal depth throughout.

A. Fore limb with four claws; inguinal shield very small.

- Posterior margin of carapace not serrated; no  
 large femoral tubercle ..... 1. *areolatus*, p. 147.  
 Posterior margin serrated; a very large conical  
 tubercle on the hinder side of the thigh .. 2. *femoralis*, p. 147.

Fig. 42.

Shell of *Homopus areolatus*.

- B. Fore limb with five claws; inguinal  
 shield large, in contact with the fe-  
 moral; posterior margin of carapace  
 serrated; a very large conical tubercle  
 on the hinder side of the thigh ..... 3. *signatus*, p. 148.

## II. Carapace very convex, gibbose behind,

posterior margin not serrated; inguinal  
shield large, in contact with the femoral;  
fore limb with four claws ..... 4. *nogueyi*, p. 148.

### 1. *Homopus areolatus*.

*Testudo areolata*, *Thunberg, Vetensk. Ac. Handl.* viii. p. 181 (1787);  
*Schoepff, Test.* p. 104, pl. xxiii. (1792); *Daud. Rept.* ii. p. 287  
(1802); *Bell, Mon. Test.* pl. — (1835); *Strauch, Chelon. Stud.*  
p. 92 (1862), and *Verth. Schildkr.* p. 35 (1865).

— *fasciata*, *Daud. l. c.* p. 294.

— *pusilla* (*non L.*), *Daud. l. c.* p. 299.

*Chersine fasciata*, *Merr. Tent.* p. 29 (1820).

— *areolata*, *Merr. l. c.* p. 30.

— *tetradactyla*, *Merr. l. c.* p. 32.

*Homopus areolatus*, *Dum. & Bibr.* ii. p. 146 (1835); *Gray, Cat.*  
*Tort.* p. 10 (1844), and *Sh. Rept.* i. p. 11 (1855), and *Proc. Zool.*  
*Soc.* 1873, p. 726.

Shell depressed, more than twice as long as deep, of equal depth throughout, margin not serrated; dorsal shields more or less swollen, separated by deep grooves, with impressed areolæ surrounded by deep concentric grooves; a small nuchal; vertebral shields broader than long, as broad as or a little narrower than the costals. Plastral lobes short, about half the width of the bridge, front lobe truncate, hind lobe openly notched; the longest median suture is between the abdominals and equals about four or five times that between the pectorals; the smallest shields are the gulars; axillary and inguinal very small. Beak very strongly hooked. A large præfrontal shield, sometimes divided longitudinally. Fore limbs covered with very large, subequal, strongly imbricate, pointed scales or tubercles, one of which, on the inner side near the elbow, is movable at right angle to the others; four claws to both pairs of limbs. Carapace olive, centre of each shield reddish brown; plastron brown in the middle, yellow towards the periphery.

Length of shell 10 centim.

South Africa.

|                                 |                    |                      |
|---------------------------------|--------------------|----------------------|
| <i>a.</i> Ad., stffld.          | Cape of Good Hope. | R. Brown, Esq. [P.]. |
| <i>b.</i> Ad., stffld.          | S. Africa.         | Sir A. Smith [P.].   |
| <i>c-d.</i> Yg., spir.          | S. Africa.         |                      |
| <i>e, f.</i> Ad., stffld.       | S. Africa.         |                      |
| <i>g, h, i.</i> Ad., skels.     | S. Africa.         |                      |
| <i>k, l, m, n.</i> Ad., shells. | S. Africa.         |                      |
| <i>o.</i> Ad., shell.           | — ?                | Dr. J. E. Gray [P.]. |

### 2. *Homopus femoralis*.

*Homopus femoralis*, *Bouleng. Proc. Zool. Soc.* 1888, p. 251, pl. xiv.

Shell depressed, more than twice as long as deep, flat on the vertebral region, posterior margin reverted and serrated; dorsal

shields not swollen, concentrically striated, separated by deep grooves; areolæ not or but feebly impressed; vertebral shields as broad as or a little narrower than the costals; nuchal small, longer than broad. Plastron and plastral shields as in the preceding. A pair of large præfrontal shields, followed by a large frontal; beak feebly hooked; lower jaw narrower than in *H. areolatus*. Fore limb covered anteriorly with very large, imbricate, pointed tubercles, one of which, on the inner side near the elbow, is movable at right angle to the others; a very large conical tubercle on the hinder side of the thigh; four claws to both pairs of limbs. Pale brown above, each shield narrowly edged with black in front and on the sides; plastral shields yellow, brown anteriorly; shielded or tuberculate soft parts pale brownish, naked parts orange.

Length of shell 13 centim.

South Africa.

a. Ad., spir.

Cradock.

Zoological Society.  
(One of the types.)

### 3. *Homopus signatus*.

*Testudo signata*, Walbaum, *Chelonogr.* pp. 71 & 120, pl. — (1782);  
*Schoepff*, *Test.* p. 120, pl. xxviii. figs. 2 & 3 (1792); *Bell*, *Mon.*  
*Test.* pl. — (1835); *Strauch*, *Verth. Schildkr.* p. 35 (1865).

— *cafra*, *Daud. Rept.* ii. p. 291 (1802).

*Chersine signata*, *Merr. Tent.* p. 30 (1820).

*Homopus signatus*, *Dum. & Bibr.* ii. p. 152 (1835); *Gray*, *Cat. Tort.*  
p. 10 (1844), and *Sh. Rept.* i. p. 11 (1855); *Bouleng. Ann. & Mag.*  
*N. H.* (6) ii. p. 136 (1888).

Shell resembling that of *H. areolatus*, except that the areolæ are less impressed in the adult, and the anterior and posterior margins are serrated: inguinal shield large, in contact with the femoral, the abdominal, and two marginals. Limbs scaled as in *H. areolatus*; a very large conical tubercle on the hinder side of the thigh. Fore limb with five claws. Forehead covered with numerous small and irregular shields. Shell yellow, shaded with brown on the plastron, and elegantly freckled and radiated with blackish brown on the carapace; head and neck yellowish, spotted with black above.

Length of shell 10 centim.

South Africa.

a. Hgr., spir. O'Kiep, Namaqualand. L. Peringuey, Esq. [C].  
Trustees of the S. African Mus. [P].

b. Ad., shell. —?

### 4. *Homopus nogueyi*.

*Homopus nogueyi*, *Lataste, Le Natur.* iii. p. 286 (1886).

Carapace very convex, gibbose behind, sloping forwards, margin not reverted nor serrated; inguinal shield large, forming a suture with the femoral, abdominal, and three marginal shields. Beak

feebly hooked; a pair of large præfrontal shields, followed by a smaller frontal; limbs with unequal-sized scales, which are mostly subcircular and juxtaposed; no enlarged femoral tubercles. Dorsal shields reddish brown, yellowish green in the centre; plastron yellowish with reddish-brown spots.

Length of shell  $13\frac{1}{2}$  centim.

Medina, Upper Senegal.

## 20. TESTUDO.

Testudo, part., *Linn. S. N.* i. p. 350 (1766).

Testudo, *Dum. Zool. Anal.* p. 77 (1806); *Wagler, Syst. Amph.* p. 138 (1830); *Dum. & Bibr.* ii. p. 35 (1835); *Gray, Cat. Tort.* p. 4 (1844), and *Sh. Rept.* i. p. 4 (1855); *Strauch, Chelon. Stud.* p. 20 (1862); *Günth. Rept. Brit. Ind.* p. 3 (1864); *Gray, Suppl. Cat. Sh. Rept.* i. p. 4 (1870); *Anders. Zool. Res. Yunnan*, p. 705 (1879).

Chersine, part., *Merrem, Tent.* p. 29 (1820).

Chersina, *Gray, Syn. Rept.* p. 14 (1831), and *Cat. Tort.* p. 11, and *Sh. Rept.* i. p. 12; *Strauch, l. c.* p. 22; *Gray, Suppl.* p. 13, and *Proc. Zool. Soc.* 1873, p. 726.

Chersus, *Wagl. l. c.* p. 138.

Geochelone, *Fitzing. Ann. Wien. Mus.* i. p. 111 (1835).

Cylindraspis, *Fitzing. l. c.* p. 112.

Chelonoidis, *Fitzing. l. c.*; *Agassiz, Contr. Nat. Hist. U. S.* i. p. 448 (1857); *Gray, Proc. Zool. Soc.* 1873, p. 724.

Chersobius, *Fitzing. l. c.*

Psammobates, *Fitzing. l. c.*

Manouria, *Gray, Proc. Zool. Soc.* 1852, p. 133, and *Cat. Sh. Rept.* i. p. 15; *Strauch, l. c.* p. 24; *Günth. l. c.* p. 10; *Gray, Suppl.* p. 15, and *Proc. Zool. Soc.* 1873, p. 725.

Teleopus, *Leconte, Proc. Ac. Philad.* 1854, p. 187.

Xerobates, *Agass. l. c.* p. 446; *Gray, Proc. Zool. Soc.* 1873, p. 723.

Megalochelys, *Agass. l. c.* p. 448; *Gray, l. c.* p. 724.

Scapia, *Gray, Proc. Zool. Soc.* 1869, p. 167, and *Suppl.* p. 6, and *Proc. Zool. Soc.* 1873, p. 725.

Peltastes, *Gray, ll. cc.* pp. 171, 8, 725.

Chersinella, *Gray, Suppl.* p. 8, and *Proc. Zool. Soc.* 1873, p. 725.

Testudinella, *Gray, ll. cc.* pp. 12, 726.

Gopher, *Gray, Proc. Zool. Soc.* 1870, p. 706.

Peltonia, *Gray, App. Cat. Sh. Rept.* p. 4 (1872).

Centrochelys, *Gray, l. c.* p. 5, and *Proc. Zool. Soc.* 1873, p. 725.

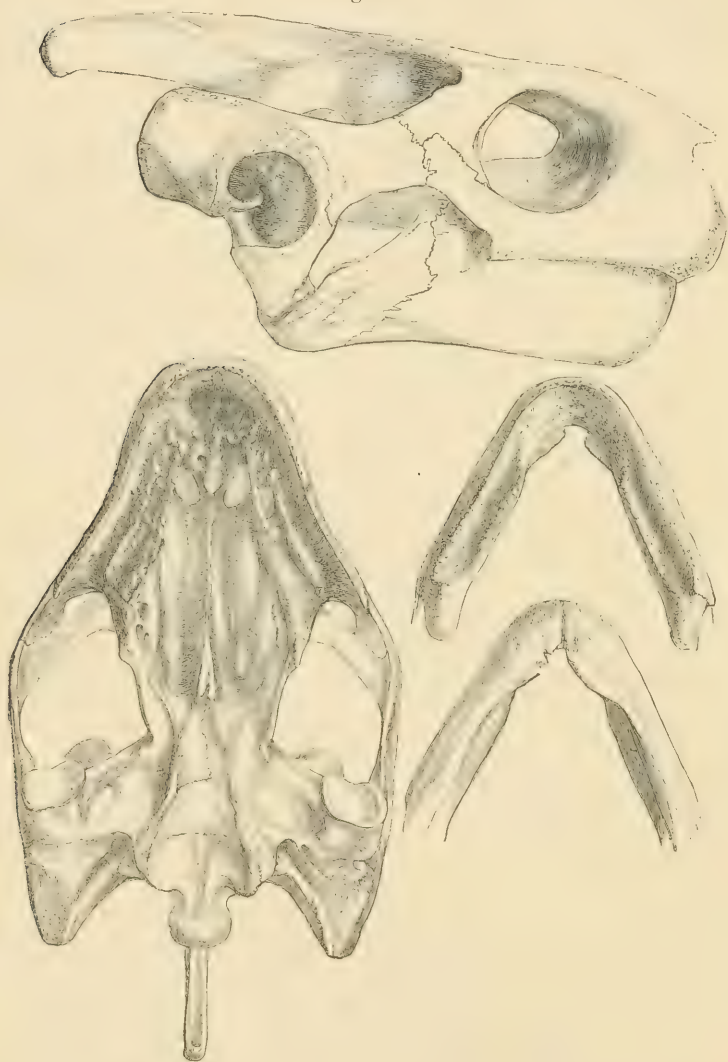
Elephantopus, *Gray, Proc. Zool. Soc.* 1873, p. 724.

Asterochelys, *Gray, l. c.*

Neural plates usually alternately tetragonal and octagonal, sometimes mostly hexagonal and short-sided behind; costal plates alternately narrower and wider. Suture between the marginal and costal bones and shields usually corresponding; supra-caudal shield usually single. Plastron extensively united to the carapace by suture, with short axillary and inguinal buttresses, which do not reach, or just reach, the costal plates; entoplastron usually anterior to the humero-pectoral suture. Skull with weak or moderately wide postorbital and temporal arches; alveolar surface of upper jaw with one or two median ridges; choanae between the

eyes. Head shielded above. Limbs club-shaped, covered with large scales or tubercles. Tail short, not longer in the young than in the adult.

Fig. 43.



Skull of *Testudo emys*. (From Gray, P. Z. S. 1869.)

Southern Europe, Southern Asia, Africa, Southern North America, South America.



*Synopsis of the Species.*

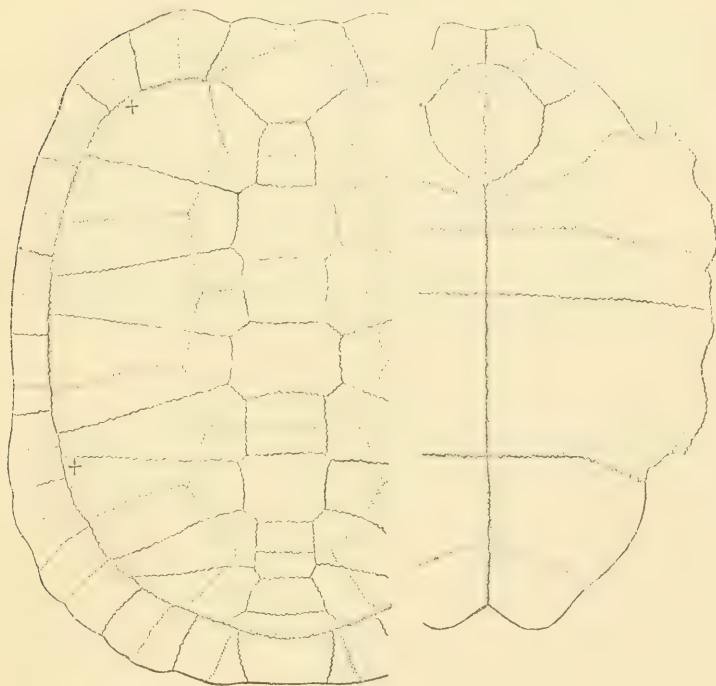
I. Alveolar surface of upper jaw with a longitudinal ridge at the symphysis, instead of a pit.

A. Shell more than twice as long as deep; beak not hooked; fore limb broadest at the extremity.

Anterior lobe of plastron bent upwards; distance from base of first claw to base of fourth toe in the hind limb equal to distance from base of first claw to base of third in the fore limb ..... 1. *polyphemus*, p. 155.

Anterior lobe of plastron not bent; distance from base of first claw to base of fourth equal in both fore and hind limb ..... 2. *agassizii*, p. 156.

Fig. 44.

Shell of *Testudo ibera*.

B. Shell less than twice as long as deep; beak hooked; fore limb broadest at the elbow ..... 3. *berlandieri*, p. 156.

- II. Carapace elongate, margin not at all reverted, dark brown or black, each dorsal shield yellowish in the centre; nuchal shield absent; gular shields distinct, not produced..... 4. *tabulata*, p. 157.
- III. Heel with particularly large, conical, spur-like bony tubercles; suture between the anal shields considerably shorter than that between the abdominals; carapace of adult uniform or closely spotted with black.
- A. Nuchal shield present; supracaudal shields two..... 5. *emys*, p. 158.
- B. Nuchal absent; supracaudal single.
1. Carapace flattened on the vertebral region.
- Lateral marginals about as long as deep, forming an angle; pectoral shields very narrow in the middle and widening gradually towards the sides ..... 6. *argentina*, p. 159.
- Lateral marginals much deeper than long, descending almost vertically; pectoral shields very narrow, widening abruptly towards the axillary notch..... 7. *calcarata*, p. 159.
2. Carapace very convex, spotted with black; nuchal margin with a very strong angular notch..... 8. *pardalis*, p. 160.
- IV. Carapace very convex, black with yellow lines radiating from the areolæ, or yellow or brownish with black radiating lines.
- A. No nuchal shield.
- Heel and hinder side of thighs with spur-like tubercles; plastron with dark radiating lines ..... 9. *elegans*, p. 161.
- Heel and hinder side of thighs without spur-like tubercles; plastron without radiating lines ..... 10. *platynota*, p. 162.
- B. Nuchal shield present.
1. Upper head-shields small and irregular.
- a. No subconical tubercle on the hinder side of the thigh.
- Nuchal very narrow, elongate; beak strongly hooked ..... 11. *geometrica*, p. 162.
- Nuchal rather large, widening posteriorly; lateral marginals forming an angle with the costals; beak feebly hooked ..... 12. *verreauxii*, p. 163.

- Nuchal minute; lateral marginals form an angle with the costals; beak feebly hooked ..... 13. *trimeni*, p. 163.
- b. A large subconical tubercle on the hinder side of the thigh.
- Nuchal minute; beak strongly hooked.... 14. *tentoria*, p. 164.
- Beak feebly hooked; suture between the gulars nearly as long as that between the anals ..... 15. *smithii*, p. 165.
- Beak feebly hooked; suture between the gulars much shorter than that between the anals ..... 16. *fiskii*, p. 165.
- Beak strongly hooked; nuchal rather large, broadest posteriorly; posterior margin of carapace strongly serrated..... 17. *oculifera*, p. 165.
2. A pair of very large præfrontal shields; shell hemispherical; gular region of plastron more or less produced..... 18. *radiata*, p. 166.
- V. Long-necked, gigantic tortoises of uniform dark brown or black coloration.
- A. Nuchal shield present; gular shields distinct.
1. Shields of carapace concentrically striated, and plastron notched behind in the adult ..... 19. *elephantina*, p. 167.
2. Shields of carapace smooth and plastron truncate behind in the adult.
- a. Width of plastral bridge two fifths the length of the carapace, which is declivous in front.
- Supracaudal shield divided ..... 20. *gigantea*, p. 168.
- Supracaudal shield undivided..... 21. *hololissa*, p. 168.
- b. Width of plastral bridge one third the length of the carapace, the anterior profile of which is nearly horizontal ..... 22. *daudinii*, p. 169.
- B. Nuchal absent; gulars distinct.
1. Shields of carapace concentrically striated in the adult.
- Plastron notched behind; profile of carapace declivous in front ..... 23. *nigrita*, p. 169.
- Plastron truncate behind in the adult; profile of carapace declivous in front ..... 24. *nigra*, p. 170.

Plastron notched behind; profile of carapace nearly horizontal in front . . . . . 25. *vicina*, p. 170.

2. Shields smooth and plastron truncate posteriorly in the adult.

*a.* Width of plastral bridge twice or twice and one fourth in the length of the carapace . . . . . 26. *microphyes*, p. 170.

*b.* Width of plastral bridge twice and a half to three times in the length of the carapace; median alveolar ridge of upper jaw much nearer the inner than the outer edge (as seen from below).

Carapace thin but well ossified . . . . . 27. *ephippium*, p. 171.

Carapace very thin, leathery . . . . . 28. *abingdonii*, p. 171.

C. Nuchal absent; gular single; plastron short.

1. Carapace thin, thickened towards the margin.

Upper profile of carapace straight, not declivous in front . . . . . 29. *indica*, p. 172.

Carapace depressed, with the upper profile undulated, slightly declivous in front . . 30. *triserrata*, p. 172.

Carapace high, with the upper profile convex, declivous in front . . . . . 31. *inepta*, p. 172.

2. Carapace extremely thin, not declivous in front in the male . . . 32. *vosmaeri*, p. 173.

VI. Carapace brown or olive, uniform or spotted with black, or black and yellow; gular shields distinct; alveolar ridge of upper jaw rather short and feeble.

A. Suture between the anal shields, if present, extremely short.

Nuchal shield usually present; suture between the pectoral shields as long as, or longer than, that between the humerals. 33. *elongata*, p. 173.

Nuchal absent; suture between the pectorals half as long as that between the humerals . . . . . 34. *forstenii*, p. 174.

B. Suture between the anal shields nearly as long as, or longer than, that between the femorals.

1. Hand with five claws.

*a.* Fifth vertebral shield not broader than third; supra-caudal undivided.

No enlarged tubercle on the hind side of the thigh; imbricate tubercles on the front of the fore limb in four or five longitudinal series . . . . . 35. *marginata*, p. 174.

- No enlarged femoral tubercle; tubercles on the front of the fore limb extremely large, in three longitudinal series . . . . . 36. *leithii*, p. 175.
- A large subconical tubercle on the hind side of the thigh. . . . . 37. *ibera*, p. 176.
- b. Fifth vertebral shield much broader than third; supracaudal usually divided; no large femoral tubercle. . . . . 38. *græca*, p. 177.
2. Hand and foot with four claws . . . 39. *horsfieldii*, p. 178.
- VII. Gular region of plastron much produced; gular shield single.
- Gular shield truncate. . . . . 40. *angulata*, p. 178.
- Gular process pointed, hooked upwards. . . 41. *yniphora*, p. 179.

### 1. *Testudo polyphemus*.

- Testudo polyphemus*, *Daud. Rept.* ii. p. 256 (1802); *Say, Journ. Ac. Philad.* iv. p. 207 (1824); *Harlan, Journ. Ac. Philad.* vi. p. 21 (1829); *Dum. & Bibr.* ii. p. 102 (1835); *Holbr. N. Am. Herp.* i. p. 25, pl. i. (1842).
- *depressa* (Cuv.), *Guérin, Icon. R. A., Rept.* pl. i. fig. 1 (1829).
- *carolina*, *Leconte, Ann. Lyc. N. Y.* iii. p. 97 (1830).
- *gopher*, *Gray, Cat. Tort.* p. 4 (1844), and *Sh. Rept.* i. p. 5 (1855).
- Xerobates carolinus*, *Agassiz, Contr. N. H. U. S.* i. p. 447 (1857).
- ? *Testudo australis*, *Girard, U. S. Explor. Exped., Herp.* p. 470 (1858).
- Xerobates gopher*, *Gray, Proc. Zool. Soc.* 1873, p. 723.
- *polyphemus*, *True, Proc. U. S. Nat. Mus.* iv. p. 434 (1881).

Shell considerably depressed, more than twice as long as deep, flattened on the vertebral region, neither notched anteriorly nor reverted nor distinctly serrated posteriorly; nuchal shield present, squarish; supracaudal undivided; shields concentrically grooved in the young, often quite smooth in the adult; vertebrals much broader than long and broader than the costals. Plastron large; front lobe bent upwards, extending beyond the carapace, gular region truncate or openly notched; hind lobe deeply notched; suture between the gulars as long as or a little shorter than that between the humerals; axillary and inguinal moderate. Head short and broad, with numerous small and irregular shields, among which a pair of præfrontals is usually recognizable. Jaws denticulated, upper not hooked, with three larger cusps at the symphysis; alveolar surface of upper jaw with a strong median ridge, which is nearer the inner than the outer border, and a strong longitudinal median ridge at the symphysis. Fore limb much compressed antero-posteriorly, broadest at the extremity, which is armed with particularly large compressed claws; the distance from the base of the first claw to the base of the fourth in the hind limb equals the distance from the



base of the first claw to the base of the third in the fore limb; fore limb anteriorly with unequal-sized, juxtaposed, or subimbricate scales; an enlarged scale on the inner side near the elbow and a series of large scales along the outer edge of the forearm; a patch of enlarged scales on the hinder side of the thigh. Dark brown or blackish; plastron brownish yellow, with irregular dark brown or black blotches.

Length of shell 24 centim.

South-eastern United States, from Southern South Carolina to the Rio Grande del Norte.

|                      |             |                          |
|----------------------|-------------|--------------------------|
| a. Yg., spir.        | E. Florida. | Smithsonian Institution. |
| b, c. ♂ ♀, stffd.    | Florida.    |                          |
| d. ♀, stffd.         | N. America. | Dr. R. Harlan.           |
| e. ♂, stffd.         | N. America. | E. Doubleday, Esq. [P.]. |
| f. ♂, stffd.         | N. America. |                          |
| g. ♀, skel.          | N. America. |                          |
| h. ♂, shell & skull. | N. America. |                          |
| i. ♀, stffd.         | Mexico (?). |                          |
| k. ♀, skel.          | Mexico (?). |                          |

## 2. *Testudo agassizii*.

*Xerobates agassizii*, Cooper, *Proc. Calif. Acad.* ii. p. 125 (1863); True, *Proc. U. S. Nat. Mus.* iv. p. 437 (1881).

Closely allied to the preceding, and differing in the following points:—Margin of shell reverted and serrated anteriorly and posteriorly, and notched anteriorly; the front lobe of the plastron nearly level with the rest of the shield. Head narrower. Fore limb narrower; the distance from the base of the first claw to the base of the fourth is equal in both fore and hind foot; no enlarged scale on the inner side of the forearm.

Southern California and Arizona.

|               |     |                          |
|---------------|-----|--------------------------|
| a. Hgr., dry. | — ? | Smithsonian Institution. |
|---------------|-----|--------------------------|

## 3. *Testudo berlandieri*.

*Xerobates berlandieri*, Agassiz, *Contr. N. H. U. S.* i. p. 447, pl. iii. figs. 17–19 (1857); True, *Proc. U. S. Nat. Mus.* iv. p. 441 (1881).

Differs from the two preceding species in the following points:—Length of the shell considerably less than the depth. Head elongate; snout narrow and pointed; beak hooked. Fore limbs broadest at the knees. Carapace yellowish brown, the areolar surface yellow; plastron light dirty yellow; head and legs yellowish grey; jaws yellowish.

North-eastern Mexico and Texas.

## *Testudo schweiggeri*. (PLATES II. & III.)

*Testudo schweiggeri*, Gray, *Syn. Rept.* p. 10 (1831); Dum. & Bibr. ii. p. 103 (1835).

This species is based on a shell, which much resembles *T. polyphemus*, but differs in the absence of a nuchal shield. It was afterwards referred by Gray to the synonymy of *T. polyphemus*, of which it is perhaps only an anomalous specimen.

*a.* Hgr., shell. — ? Mus. College of Surgeons [E.]  
(Type.)

#### 4. *Testudo tabulata*.

? *Testudo denticulata*, *Linm. S. N.* i. p. 352 (1766); *Daud. Rept.* ii. p. 303 (1802).

*Testudo tabulata*, *Walbaum, Chelonogr.* p. 122 (1782); *Schoepff, Test.* p. 56, pls. xii. fig. 2, xiii., & xiv. (1792); *Daud. Rept.* ii. p. 242 (1802); *Wied, Beitr. Nat. Bras.* i. p. 51, and *Abbild.* pl. — (1825); *Bell, Mon. Test.* pl. — (1835); *Dum. & Bibr.* ii. p. 89 (1835); *Gray, Cat. Tort.* p. 5 (1844), and *Sh. Rept.* i. p. 5 (1855); *Strauch, Chelon. Stud.* p. 80 (1862), and *Verth. Schildkr.* p. 25 (1865); *Gray, Suppl. Cat. Sh. Rept.* i. p. 4 (1870).

— *denticulata*, *Schoepff, l. c.* p. 119, pl. xxviii. fig. 1.

— *tessellata*, *Schneid. Schrift. Berl. Naturf. Fr.* x. p. 262 (1792).

*Chersine tessellata*, *Merr. Tent.* p. 31 (1820).

*Testudo hercules*, *Spix, Test. Bras.* p. 20, pl. xiv. (1824).

— *sculpta*, *Spix, l. c.* p. 21, pl. xv.

— *carbonaria*, *Spix, l. c.* p. 22, pl. xvi.; *Bell, l. c.*; *Dum. & Bibr.* p. 99; *Strauch, ll. cc.* pp. 81, 27.

— *cagado*, *Spix, l. c.* p. 23, pl. xvii.

*Chersine tabulata*, *Gravenh. Delic. Mus. Vratisl., Rept.* p. 19 (1829).

*Testudo boiei*, *Wagl. Icon. Amph.* pl. xiii. (1829).

*Chelonoides tabulata*, *Gray, Proc. Zool. Soc.* 1873, p. 724, pl. lx. fig. 3.

Shell very thick, elongate, not more than half as deep as long; carapace with straight upper profile, declivous in front and behind, with the margin not reverted nor serrated; edge of anterior and posterior marginals spinose in the very young; anterior margin not or but feebly notched; no nuchal shield; supracaudal undivided, curved inwards; dorsal shields more or less strongly grooved concentrically, rarely smooth; vertebral shields much broader than long, at least as broad as costals. Plastron large; front lobe not produced, truncate, bent upwards, not or but slightly extending beyond the carapace; hind lobe broadly notched posteriorly. Head moderate; a large præfrontal and a large frontal, undivided, or one or both divided into two by a median suture; beak feebly hooked; edge of jaws denticulated; alveolar surface of upper jaw with a strong, tubercular, median ridge. Fore limb anteriorly with large, unequal-sized, roundish, juxtaposed or subimbricate scales, one of which, on the inner side near the elbow, is usually much enlarged; no conical tubercles on the back of the thighs. Carapace dark brown or black, each dorsal shield yellowish or orange in the centre; plastron brown and yellow, often yellow with a large median roundish dark brown area. Head and limbs with orange or red spots.

Length of shell 55 centim.

Tropical South America east of the Andes ; Windward Islands.

|                                                        |                     |                          |
|--------------------------------------------------------|---------------------|--------------------------|
| <i>a.</i> Hgr.                                         | W. Indies.          | J. Gould, Esq. [P.].     |
| <i>b.</i> Hgr. ♂, skel.                                | Cayenne.            |                          |
| <i>c-d.</i> Yg., spir.                                 | Pernambuco.         | W. A. Forbes, Esq. [P.]. |
| <i>e, f.</i> ♂ ♀, stffid. (skull<br>& bones separate). | Para.               |                          |
| <i>g.</i> Yg., spir.                                   | Xeberos, N.E. Peru. |                          |
| <i>h.</i> Hgr., stffid.                                | Brazil.             |                          |
| <i>i, k.</i> ♂ ♀, stffid.                              | Tropical America.   |                          |
| <i>l, m, n, o, p.</i> ♂, ♀, & yg.,<br>skels.           | Tropical America.   |                          |
| <i>q, r, s, t, u.</i> ♂, ♀, hgr. &<br>yg., shells.     | Tropical America.   |                          |

### 5. *Testudo emys*.

- Testudo emys*, *Schleg. & Müll. in Temminck, Verh. Nat. Nederl. Ind.* p. 34, pl. iv. (1844); *Anderson, Proc. Zool. Soc.* 1872, p. 132, figs. *Geoemyda spinosa*, part., *Cantor, Cat. Mal. Rept.* p. 2 (1847). *Testudo emydoides*, *A. Dum. Cat. Méth. Rept.* p. 4 (1851). *Manouria fusca*, *Gray, Proc. Zool. Soc.* 1852, p. 134, and *Cat. Sh. Rept.* i. p. 16, pl. iii. (1855), and *Proc. Zool. Soc.* 1863, p. 395, pl. xxxi., and *Suppl. Cat. Sh. Rept.* i. p. 15 (1870). *Testudo phayrei*, *Blyth, Journ. As. Soc. Beng.* xxii. p. 639 (1853); *Theob. Proc. Zool. Soc.* 1870, p. 674; *Stoliczka, Ann. & Mag. N. II.* (4) viii. p. 212 (1871); *Anders. Proc. Zool. Soc.* 1871, p. 425, figs. *Teleopus luxatus*, *Leconte, Proc. Ac. Philad.* 1854, p. 187. *Manouria luxata*, *Strauch, Chelon. Stud.* p. 25 (1862).  
 — *emys*, *Strauch, l. c.*; *Günth. Rept. Brit. Ind.* p. 10 (1864); *Gray, Proc. Zool. Soc.* 1871, p. 517, and *App. Cat. Sh. Rept.* p. 7 (1872); *Theob. Cat. Rept. Brit. Ind.* p. 4 (1876). *Testudo* (*Scapia*) *falconeri*, *Gray, Proc. Zool. Soc.* 1869, p. 169, figs., and 1871, p. 515. *Scapia falconeri*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 6.  
 — *phayrei*, *Gray, Ann. & Mag. N. II.* (4) viii. p. 320 (1871).  
 — *gigantea*, *Gray, App. Cat. Sh. Rept.* p. 8. *Geoemyda impressa*, *Günth. Proc. Zool. Soc.* 1882, p. 343, figs.

Shell considerably depressed, its depth not half its length; anterior and posterior margins reverted, more or less strongly serrated; nuchal present; supracaudal shields two; discal shields concentrically striated, often concave; vertebrals much broader than long and at least as broad as costals. Plastron large, gular region somewhat produced and usually notched, hind lobe deeply notched; the pectoral shields may be widely separated from each other, or from a short median suture; axillary shield very small, inguinal large. Head moderate; two large præfrontal shields and a large frontal; beak not hooked; jaws feebly denticulated, the alveolar surface of the upper jaw with a strong median ridge. Fore limb anteriorly with very large, bony, pointed, imbricate tubercles, forming four or five longitudinal series; hind limb with very large bony tubercles on the plantar surface, and larger, conical, spur-like ones on the heel, and a group of still larger, conical ones on each side on the back of

the thighs. Adult dark brown or blackish; carapace of young yellowish brown, with dark-brown markings.

Length of shell 46 centim.

Burma, Siam, Malay Peninsula, Sumatra.

|                   |         |                                      |
|-------------------|---------|--------------------------------------|
| a. ♀, stffid.     | Pinang. | Dr. Cantor.                          |
| b. ♂, shell.      | Pinang. | Dr. Cantor.                          |
| c. ♂, shell.      | Pinang. | (Type of <i>Manouria fusca</i> .)    |
| d. Hgr., shell.   | Siam.   | (Type of <i>Geoemyda impressa</i> .) |
| e. ♀, stffid.     | —?      |                                      |
| f. Ad., carapace. | —?      |                                      |

### 6. *Testudo argentina*.

*Testudo sulcata*, part., *Dum. & Bibr.* ii. p. 74 (1835).

— *sulcata* (non *Gm.*), *D'Orbigny, Voy. Amér. Mérid., Rept.* p. 6 (1847); *Burm. Reise La Plata*, ii. p. 521 (1861).

— (Gopher) *chilensis*, *Gray, Ann. & Mag. N. II.* (4) vi. pp. 190 & 428 (1870), and *Proc. Zool. Soc.* 1870, p. 706, pl. xl., and *App. Cat. Sh. Rept.* p. 2 (1872).

— *argentina*, *Sc Slater, Ann. & Mag. N. II.* (4) vi. p. 471 (1870), and *Proc. Zool. Soc.* 1871, p. 480.

Shell considerably depressed, its depth not half its length; anterior and posterior margins reverted and serrated; lateral marginals strongly keeled and forming an angle; nuchal shield absent; supracaudal shield undivided; shields strongly grooved concentrically; vertebrals much broader than long and at least as broad as costals. Plastron large, gular region somewhat produced and bifid, hind lobe deeply notched posteriorly; the pectoral shields, which are very narrow in the middle, widen gradually towards the sides; suture between the gulars about half as long as that between the humerals, and longer than that between the pectorals; axillary shield very small, inguinal larger. Head moderate; two large præfrontal shields and a large frontal; snout short, beak hooked, tricuspid; edge of jaws strongly dentate; alveolar surface of upper jaw with a strong tuberculate median ridge. Fore limb anteriorly with large, bony, obtusely pointed, imbricate tubercles of unequal size; hind limb with large bony tubercles on the plantar surface, and larger, conical, spur-like ones on the heel; a group of enlarged subconical tubercles on each side on the back of the thighs. Uniform brownish or horn-colour, the suture between the shields darker.

Length of shell 22 centim.

Argentine Republic, Northern Patagonia.

|                     |          |          |
|---------------------|----------|----------|
| a, b. Hgr., stffid. | Mendoza. | (Types.) |
|---------------------|----------|----------|

### 7. *Testudo calcarata*.

*Testudo calcarata*, *Schneid. Samml. verm. Abhandl.* p. 317, pl. — (1784).

— *sulcata*, *Gmel. S. N.* p. 1045 (1789); *Shaw, in Miller, Cimel. Physic.* p. 53, pl. xxvi. (1796); *Daud. Rept.* ii. p. 313 (1802); *Gray, Syn. Rept.* p. 68 (1831), and *Cat. Tort.* p. 7 (1844), and *Sh.*

*Rept.* p. 9 (1855); *Strauch, Chelon. Stud.* p. 78 (1862), and *Verth. Schildkr.* p. 22 (1865); *Sowerby & Lear, Tort.* pls. xvii. & xviii. (1872).

*Chersine calcarata*, *Merr. Tent.* p. 32 (1820).

*Testudo radiata*, var. *senegalensis*. *Gray, Syn. Rept.* p. 11.

— *sulcata*, part., *Dum. & Bibr.* ii. p. 74, pl. xiii. fig. 1 (1835).

*Peltastes sulcatus*, *Gray, Proc. Zool. Soc.* 1869, p. 173, and *Suppl.*

*Cat. Sh. Rept.* i. p. 12 (1870), and *App.* p. 6 (1872).

*Centrochelys sulcatus*, *Gray, Proc. Zool. Soc.* 1873, p. 725.

Shell not more than twice as long as deep, flattened on the vertebral region, descending abruptly on the sides; anterior and posterior margins reverted; lateral marginals much deeper than long; nuchal shield absent; supracaudal undivided; shields strongly grooved concentrically; vertebrals much broader than long and at least as broad as costals. Plastron large, gular region somewhat produced and bitid, hind lobe deeply notched posteriorly; pectoral shields very narrow and with straight anterior border throughout the greater part of their extent, widening abruptly towards the axillary notch; suture between the anals very short; axillary and inguinal small. Head moderate; two large præfrontal shields and a large frontal; beak hooked, tricuspid; edge of jaws strongly dentate; alveolar surface of upper jaw with a strong tuberculate median ridge. Fore limb anteriorly with large, bony, pointed, imbricate tubercles of unequal size; hind limb with large, conical, spur-like bony tubercles on the heel; two or three very large conical tubercles on each side on the back of the thighs. Uniform brownish or horn-colour above, yellowish inferiorly.

Length of shell 36 centim.

Tropical and South Africa.

a. Hgr., stffid.

b. ♀, skel.

c. Ad., carapace.

d. ♀, stffid.

Abyssinia.

S. Africa.

S. Africa.

—?

Dr. Rüppell.

### 8. *Testudo pardalis*.

*Testudo pardalis*, *Bell, Zool. Journ.* iii. p. 420 (1828), and *Mon. Test.* pl. — (1835); *Dum. & Bibr.* ii. p. 71 (1835); *Gray, Cat. Tort.* p. 7 (1844), and *Sh. Rept.* i. p. 9 (1855); *Strauch, Chelon. Stud.* p. 77 (1862); *Gray, Ann. & Mag. N. H.* (3) xii. p. 382 (1863); *Strauch, Verth. Schildkr.* p. 22 (1865); *Gray, Suppl. Cat. Sh. Rept.* i. p. 6 (1870); *Peters, Reise n. Mossamb.* iii. p. 2 (1882).

Shell not more than twice as long as broad, vertebral shields more or less convex; sides nearly vertical; anterior and posterior margins reverted and serrated; nuchal border deeply notched; nuchal shield absent; supracaudal undivided; dorsal shields concentrically striated, vertebrals broader than long and at least as broad as costals. Plastron large; gular region not or but very slightly produced, openly notched; hind lobe deeply notched, bifid; pectoral shields very narrow and with straight anterior border throughout the greater part of their extent, widening abruptly towards the axillary



notch; suture between the anals very short; axillary and inguinal small. Head moderate; a pair of large præfrontal shields; beak feebly hooked, tricuspid; edge of jaws strongly dentate; alveolar surface of upper jaw with a strong tuberculate median ridge. Fore limb anteriorly with scattered, rhomboidal, large bony tubercles; hind limb with large, conical, spur-like bony tubercles on the heel; two or three very large conical tubercles on the back of the thighs. Yellowish or horn-colour, carapace closely spotted with black; plastron uniform or with a few small black spots or radiating streaks.

Length of shell 43 centim.

Africa south of the Equator.

|                                  |                    |                            |
|----------------------------------|--------------------|----------------------------|
| a. Hgr., shell.                  | E. Central Africa. | Capt. Speke [P.].          |
| b. ♀, shell.                     | Algoa Bay.         | — Dunsterville, Esq. [P.]. |
| c. Yg., stf'd.                   | S. Africa.         | Sir A. Smith [P.].         |
| d, e, f, g. ♂, ♀, & hgr., stf'd. | S. Africa.         |                            |
| h. ♂, skel.                      | S. Africa.         |                            |
| i, k. Hgr. & yg., shells.        | S. Africa.         |                            |
| l. ♀, shell.                     | — ?                |                            |

### 9. *Testudo elegans*.

*Testudo elegans*, *Schoepff, Test.* p. 111, pl. xxv. (1792); *Daud. Rept.* ii. p. 265 (1802); *Günth. Rept. Brit. Ind.* p. 4 (1864); *Theob. Cat. Rept. Brit. Ind.* p. 2 (1876).

— *stellata*, *Schweigg. Prodr.* p. 56 (1814); *Gray, Cat. Tort.* p. 7 (1844), and *Sh. Rept.* i. p. 7 (1855).

*Chersine elegans*, *Merr. Tent.* p. 33 (1820).

*Testudo actinodes*, *Bell, Zool. Journ.* iii. p. 419 (1828), and *Mon. Test.* pl. — (1835); *Dum. & Bibr.* ii. p. 66 (1835); *Strauch, Chelon. Stud.* p. 75 (1862), and *Verth. Schildkr.* p. 19 (1865).

— *geometrica*, *Hutton, Journ. As. Soc. Beng.* vi. p. 689, pl. xxxviii. (1837).

— *megalopus*, *Blyth, Journ. As. Soc. Beng.* xxii. p. 640 (1854).

*Peltastes stellatus*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 8 (1870).

Carapace very convex, dorsal shields often forming humps; lateral margins nearly vertical; posterior margin somewhat expanded and strongly serrated; no nuchal; supracaudal undivided, incurved in the male; shields strongly striated concentrically; first vertebral longer than broad, the others broader than long, third at least as broad as the corresponding costal. Plastron large, truncate or openly notched in front, deeply notched, bifid behind; suture between the humerals much longer than that between the femorals; suture between the pectorals very short; axillary and inguinal rather small. Head moderate; forehead swollen, with convex forehead covered with rather small and irregular shields; beak feebly hooked, bi- or tricuspid; edge of jaws denticulated; alveolar ridge of upper jaw strong. Outer anterior face of fore limb with numerous unequal-sized large imbricate pointed tubercles; heel with large, more or less spur-like tubercles; a group of large conical or subconical tubercles on the hinder side of the thigh. Carapace black, with yellow arcolæ from which

yellow rays radiate; these rays usually narrow and very numerous; plastron likewise with black and yellow radiating streaks.

Length of shell 26 centim.

India and Ceylon.

|                                        |                             |                              |
|----------------------------------------|-----------------------------|------------------------------|
| <i>a, b.</i> ♀ & yg., shells.          | Sind.                       | Dr. Leith [P.].              |
| <i>c.</i> Yg., spir.                   | Ganjam.                     | F. Day, Esq. [P.].           |
| <i>d, e, f.</i> ♂ ♀, stffd.            | India.                      |                              |
| <i>g.</i> Hgr., spir.                  | India.                      |                              |
| <i>h.</i> Yg., shell.                  | India.                      | Dr. Falconer [P.].           |
| <i>i.</i> ♀, stffd.                    | Ceylon.                     | Dr. J. E. Gray [P.].         |
| <i>k.</i> ♀, stffd.                    | Ceylon.                     |                              |
| <i>l.</i> ♀, stffd.                    | Muscat, Arabia (imported?). | A. S. G. Jayakar, Esq. [P.]. |
| <i>m, n, o, p, q.</i> ♀ & yg., shells. | —?                          |                              |

### 10. *Testudo platynota*.

*Testudo platynota*, *Blyth, Journ. As. Soc. Beng.* xxxii. p. 83 (1863); *Theob. Cat. Rept. Brit. Ind.* p. 2 (1876); *Anders. Zool. Res. Yunnan*, p. 712 (1879).

*Peltastes platynotus*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 8 (1870), and *Proc. Zool. Soc.* 1870, p. 655, pl. xxxiii.

Very closely allied to the preceding, but carapace more regularly oval, posterior border not or but very slightly expanded, and more feebly serrated; vertebral shields flat. Yellow rays on the discal shields wider and fewer, usually three to the right and three to the left of each shield; plastron yellow, with some large black blotches but without radiating streaks. According to Anderson, the scales on the fore limb are fewer and all rounded, the sharp scales on the heel are absent, and the conical scales on the posterior portion of the thigh are very much smaller and not at all prominent.

Upper Burma and Northern Pegu.

|                                    |        |                         |
|------------------------------------|--------|-------------------------|
| <i>a, b, c.</i> Ad. & yg., shells. | Burma. | W. Theobald, Esq. [C.]. |
|------------------------------------|--------|-------------------------|

### 11. *Testudo geometrica*.

*Testudo geometrica*, *Linn. S. N.* i. p. 353 (1766); *Schoepff, Test.* p. 49, pl. x. (1792); *Daud. Rept.* ii. p. 260, pl. xxv. fig. 1 (1802); *Bell, Mon. Test.* pl. — (1835); *Dum. & Bibr.* ii. p. 57 (1835); *Gray, Cat. Tort.* p. 8 (1844), and *Sh. Rept.* i. p. 8 (1855); *Stranch, Chelon. Stud.* p. 74 (1862); *Bouleng. Proc. Zool. Soc.* 1886, p. 541.

— *luteola*, *Daud. l. c.* p. 277, pl. xxv. fig. 3.

*Chersine geometrica*, *Merr. Tent.* p. 32 (1820).

*Peltastes geographicus*, *Gray, Proc. Zool. Soc.* 1869, p. 173.

— *geometricus*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 9 (1870).

Shell very convex, the dorsal shields sometimes swollen and sub-conical; margin not forming an angle with the costal shields, not or but feebly reverted or serrated; shields very strongly striated concentrically; 11 marginals on each side, rarely 12; nuchal elongate,

narrow; supracaudal single, incurved; vertebrals as broad as or narrower than costals, first as long as broad or longer than broad. Plastron large, truncate or openly notched in front, deeply notched behind; suture between the gulars longer than that between the anals; suture between the humerals as long as that between the femorals, and much longer than that between the pectorals; axillary small, inguinal large. Head moderate, with convex forehead and strongly hooked beak; upper head-shields small and irregular; alveolar ridge of upper jaw feeble. Anterior face of fore limb with only a few (five or six), separated, very large scutes; no large tubercle on the hinder side of the thigh. Carapace black, with yellow areolæ from which yellow rays radiate; eight to twelve yellow rays on the vertebrals, nine to twelve on the costals, two to four on the marginals; plastron brown and yellow, the two colours forming more or less ill-defined rays, or yellow, with black radiating streaks.

Length of shell 135 millim.

South Africa (Cape Peninsula).

|                                                    |                    |                          |
|----------------------------------------------------|--------------------|--------------------------|
| <i>a.</i> Hgr., stffd.                             | Cape of Good Hope. |                          |
| <i>b, c.</i> Ad., shell.                           | Cape of Good Hope. | Gen. Hardwicke [P.].     |
| <i>d, e.</i> Ad. & hgr., shells.                   | Cape of Good Hope. | Rev. G. H. R. Fisk [P.]. |
| <i>f, g, h, i, k, l, m, n.</i> Ad. & hgr., shells. | Cape of Good Hope. |                          |

## 12. *Testudo verreauxii*.

*Testudo verroxii*, *Smith, Ill. Zool. S. Afr., Rept.* pl. viii. (1839); *Gray, Cat. Tort.* p. 9 (1844); *Bouleng. Proc. Zool. Soc.* 1886, p. 541; *Boettg. Ber. Senck. Ges.* 1887, p. 139.

Allied to *T. geometrica*. Lateral marginals forming an angle with the costals; nuchal well developed, a little longer than broad. Suture between the gulars as long as that between the anals; suture between the humerals much longer than that between the pectorals or the femorals. Beak very feebly hooked. Fore limb anteriorly with very large scutes; no enlarged tubercle on the hinder side of the thighs. Carapace dark brown, each dorsal and costal shield with four or five yellow rays proceeding from the yellow areolæ; plastron yellow, dark brown in the middle.

Length of shell 85 millim.

South Africa, near the sources of the Orange River.

## 13. *Testudo trimeni*.

*Testudo trimeni*, *Bouleng. Proc. Zool. Soc.* 1886, p. 541, pl. lvii.

Allied to *T. geometrica*. Anterior and posterior margins serrated; lateral marginals forming an angle with the costals, a convex border with a well-marked longitudinal groove; nuchal minute. Suture between the gulars as long as, or shorter than, that between the anals; suture between the humerals usually not, or but little, longer than that between the pectorals or the femorals. Beak very feebly

hooked; fore limb anteriorly with extremely large imbricate scutes, the four largest of which form a continuous series from the elbow to the outer fingers; no conical tubercle on the hinder side of the thigh. Carapace black, with broad yellow or orange rays radiating from a small spot on the areolæ; five or six rays on the vertebral plates, and four to eight on the costals; a yellow spot or streak at the junction of two plates; one or two rays on each marginal; plastron dark brown or black in the centre, with yellow rays, yellow on the sides.

Length of shell 105 millim.

South Africa (mouth of the Orange River).

|                                     |                            |                         |            |
|-------------------------------------|----------------------------|-------------------------|------------|
| <i>a.</i> Ad., stffd.               | Mouth of the Orange River. | Rev. G. H. R. Fisk [P.] | } (Types.) |
| <i>b, c, d.</i> Ad. & hgr., shells. | Mouth of the Orange River. | Rev. G. H. R. Fisk [P.] |            |
| <i>e.</i> Ad., stffd.               | S. Africa.                 |                         |            |
| <i>f.</i> Hgr., shell.              | S. Africa.                 |                         |            |

#### 14. *Testudo tentoria*.

*Testudo tentoria*, *Bell, Zool. Journ.* iii. p. 420 (1828), and *Mon. Test.* pl. — (1835); *Bouleng. Proc. Zool. Soc.* 1886, p. 541.

— *geometrica*, var. *tentoria*, *Gray, Cat. Tort.* p. 8 (1844), and *Sh. Rept.* i. p. 8 (1855).

— — —, var. *nigriventris*, *Gray, Sh. Rept.* p. 8.

*Peltastes tentorius*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 9 (1870).

Allied to *T. geometrica*. Anterior and posterior margins feebly serrated; lateral marginals sometimes forming an angle with the costals; number of marginals varying from 11 to 13 on each side; nuchal minute. Suture between the gulars as long as, or shorter than, that between the anals; suture between the humerals longer than that between the pectorals or the femorals. Beak strongly hooked. An enlarged subconical tubercle on the hinder side of the thigh. Carapace black, the centre of the areolæ with a small yellow or orange spot, from which narrow rays of the same colour radiate; eight to twelve rays on the vertebrals, twelve to fourteen on the costals, three or four on the marginals; plastron brown in the middle, yellow on the sides.

Length of shell 120 millim.

South Africa.

|                                           |                    |                          |
|-------------------------------------------|--------------------|--------------------------|
| <i>a, b, c.</i> Ad. & yg., shells.        | Beaufort West.     | Rev. G. H. R. Fisk [P.]. |
| <i>d.</i> Ad., skel.                      | Cape of Good Hope. | Rev. G. H. R. Fisk [P.]. |
| <i>e, f, g.</i> Ad. & hgr., shells.       | Cape of Good Hope. | R. Brown, Esq. [P.].     |
| <i>h.</i> Yg., stffd.                     | —— ?               |                          |
| <i>i, k, l, m, n.</i> Ad. & hgr., shells. | —— ?               |                          |

15. *Testudo smithii*. (PLATE IV.)

*Testudo verroxii* (*non Smith*), *Gray, Cat. Sh. Rept. i. p. 8* (1855).

*Peltastes verroxii*, *Gray, Suppl. Cat. Sh. Rept. i. p. 9* (1870).

*Testudo smithii*, *Bouleng. Proc. Zool. Soc. 1886, p. 542*.

Allied to *T. geometrica*. Lateral marginals not forming an angle with the costals; nuchal longer than broad. Suture between the gulars nearly as long as that between the anals; suture between the humerals much longer than that between the pectorals or the femorals. Beak feebly hooked. Fore limb anteriorly with very large imbricate scutes, forming four longitudinal and five transverse series; a very large subconical tubercle on the hinder side of the thigh. Carapace dark brown, with radiating, narrow, yellow, black-edged rays, meeting in the centre of the areolæ; plastron yellow, with dark brown rays, the brown predominating in the middle.

Length of shell 115 millim.

South Africa.

a. ♀, stffid.

S. Africa.

(Type.)

16. *Testudo fiskii*.

*Testudo fiskii*, *Bouleng. Proc. Zool. Soc. 1886, p. 542, pl. lviii*.

Allied to *T. geometrica*. Lateral marginals not forming an angle with the costals; nuchal longer than broad. Suture between the gulars shorter than that between the anals; suture between the humerals much longer than that between the pectorals or the femorals. Beak feebly hooked. Fore limb anteriorly with very large imbricate scutes, in three longitudinal and five transverse series; a large conical tubercle on the hinder side of the thigh. Carapace with brownish-yellow and black rays of nearly equal width, radiating from the yellow areolæ; six black rays on each vertebral and costal shield, and two on each marginal; the anterior and posterior pair of black rays on the costals and vertebrae meeting their fellow form three series of ocelli; plastron dirty yellow, brown in the middle.

Length of shell 75 millim.

South Africa.

a. ♂, spir.

De Aar, near Hopetown.

Rev. G. H. R. Fisk [P.].

(Type.)

17. *Testudo oculifera* \*.

*Testudo oculifera*, *Kuhl, Beitr. z. Zool. p. 77* (1820); *Strauch, Verth. Schildkr. p. 61* (1865).

\* As suspected by Dr. Strauch, the type specimen in the Berlin Museum has proved to be referable to this species. At my request, my colleague Mr. O. Thomas has kindly examined the specimen during a recent visit to the Berlin Museum, and drawn up some notes which show that the pectoral shields are separated on the median line, as in some specimens of *Testudo emys*.



*Emys oculifera*, *Gray, Syn. Rept.* p. 22 (1831), and *Cat. Tort.* p. 28 (1844).

*Testudo semiserrata*, *Smith, Ill. Zool. S. Afr., Rept.* pl. vi. (1839); *Gray, Cat. Tort.* p. 8, and *Sh. Rept.* i. p. 9 (1855); *Bouleng. Proc. Zool. Soc.* 1886, p. 542; *Boettg. Ber. Senckenb. Ges.* 1887, p. 138.

*Clemmys oculifera*, *Strauch, Chelon. Stud.* p. 32 (1862).

*Peltastes semiserratus*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 9 (1870).

Allied to *T. geometrica*. Lateral marginals not forming an angle with the costals; anterior and posterior margins strongly serrated; number of marginals varying from 10 to 12 on each side; nuchal rather large, broadest behind. Plastron notched anteriorly; suture between the gulars as long as, or longer than, that between the anals; suture between the humerals much longer than that between the pectorals or the femorals. Beak strongly hooked. Fore limb with only a few large tubercular scutes, one of which is subcircular and extremely large; a large subconical tubercle on the hinder side of the thigh. Carapace with brownish-yellow and dark brown or black radiating rays, usually of nearly equal width, six to ten in number on the vertebral and costal shields; plastron yellowish, with dark brown rays.

Length of shell 115 millim.

South Africa.

|                                |                                     |                                               |
|--------------------------------|-------------------------------------|-----------------------------------------------|
| <i>a.</i> ♀, stffid.           | S. Africa.                          | Sir A. Smith [P.]                             |
|                                |                                     | (One of the types of <i>T. semiserrata</i> .) |
| <i>b.</i> Yg., spir.           | S. Africa.                          | Sir A. Smith [P.]                             |
| <i>c, d, e.</i> ♂ ♀, stffid.   | S. Africa.                          |                                               |
| <i>f, g, h, i, k, l, m, n.</i> | S. Africa.                          |                                               |
| Ad. & hgr., shells.            |                                     |                                               |
| <i>o.</i> Yg., spir.           | Cape Colony.                        | F. M. P. Weale, Esq. [P.]                     |
| <i>p.</i> Ad., dry.            | Between Richmond and Victoria West. | Rev. G. H. R. Fisk [P.]                       |

### 18. *Testudo radiata*.

*Testudo radiata*, *Shaw, Zool.* iii. p. 22, pl. ii. (1802); *Bell, Mon. Test.* pl. — (1835); *Dum. & Bibr.* ii. p. 83 (1835); *Gray, Cat. Tort.* p. 6 (1844), and *Sh. Rept.* i. p. 9 (1855); *Strauch, Chelon. Stud.* p. 79 (1862), and *Verth. Schildkr.* p. 25 (1865); *Gray, Suppl. Cat. Sh. Rept.* i. p. 5 (1870); *Peters, Reise n. Mossamb.* iii. p. 3 (1882).  
 — coui, *Daud. Rept.* ii. p. 271, pl. xxvi. (1802).  
 — desertorum, *Grandid. Rev. et Mag. de Zool.* (2) xxi. p. 257 (1869).

*Astrochelys radiata*, *Gray, Proc. Zool. Soc.* 1873, p. 724.

Carapace very convex, hemispherical; shields strongly striated concentrically, except in old specimens, which are smooth; posterior margin more or less reverted and serrated; nuchal present; supra-caudal single; vertebrals not broader than the costals. Plastron large; gular region more or less produced and notched; hind lobe angularly notched; pectoral shields very narrow; suture between the gulars longer than that between the anals; axillary small, inguinal rather large. Head moderate; a pair of large præfrontal shields;

beak scarcely hooked; jaws denticulated; alveolar surface of upper jaw with a strong median ridge. Fore limb with roundish imbricate scales, a few only of which are very large; no enlarged tubercle on the hinder side of the thigh. Carapace black, with yellow areolar spots from which yellow streaks radiate; the rays from the costal areolæ to the lower border of the same shield are the largest and the most constant; plastron yellow with black rays or large angular black spots, or black with yellow rays.

Length of shell 33 centim.

Madagascar.

|                                                  |             |                             |
|--------------------------------------------------|-------------|-----------------------------|
| <i>a, b, c, ♂ &amp; yg., stffid.</i>             | Madagascar. |                             |
| <i>d. ♀, skel.</i>                               | Madagascar. |                             |
| <i>e. ♂, shell.</i>                              | Madagascar. | Rev. G. H. R. Fisk [P.].    |
| <i>f, g. ♂ &amp; hgr., shells.</i>               | Madagascar. | Gen. Hardwicke [P.].        |
| <i>h. Hgr., carapace.</i>                        | Madagascar. | Royal Society [P.]. (Type.) |
| <i>i, k, l, m, n, o. Hgr. &amp; yg., shells.</i> | Madagascar. |                             |
| <i>p. Yg., stffid.</i>                           | —?          |                             |

### 19. *Testudo elephantina*\*.

*Testudo indica*, part., *Gray, Syn. Rept.* p. 9 (1831), and *Cat. Tort.* p. 5 (1844), and *Sh. Rept.* i. p. 6, pl. xxxv. fig. 1 (1855), and *Suppl.* p. 5 (1870).

— *elephantina*, part., *Dum. & Bibr.* ii. p. 110 (1835).

*Megalochelys indica*, *Gray, Proc. Zool. Soc.* 1873, p. 724.

*Testudo elephantina*, *Günth. Gig. Land-Tort.* p. 21, pls. i.-iv., viii.-xvii., xix. (1877); *Peters, Reise n. Mossamb.* iii. p. 3, pl. iii. B (1882).

— *ponderosa*, *Günth. l. c.* p. 35, pls. vi., viii., ix., xiii., & xviii.

Shell thick, not twice as long as deep, declivous in front and behind, with the anterior and posterior margins feebly reverted; anterior margin not, or but feebly notched; nuchal shield present, small; supracaudal undivided; dorsal shields more or less distinctly grooved concentrically, even in the adult; vertebral shields much broader than long, at least as broad as costals. Plastron rather large, lobes narrowed, truncated in front, notched behind; the width of the bridge is contained about twice and one third in the length of the carapace; median sutures between the gulars, the pectorals, and the anals very short; axillary and inguinal small. Head small, with convex forehead; a pair of very large shields cover the forehead; beak feebly hooked, bi- or tricuspid; edge of jaws feebly denticulated; alveolar surface of upper jaw with a strong tubercular median ridge; neck long. Fore limb anteriorly with large, unequal-

\* For a full account of the specimens of Gigantic Land-Tortoises in the Museum, consult Günther's Monograph, forming a Catalogue to that part of the Collection. In the case of the extinct Mascarene forms, I have limited myself to reproducing the original diagnoses. Since the publication of that work two more extinct species (probably contemporaries of the Mascarene forms) have been described from Madagascar, viz. *T. abrupta*, Grandid., and *T. grandidieri*, Vaill. (= *Emys gigantea*, Grandid.); cf. C. R. Ac. Sc. c. 1885, p. 874.

sized, roundish, juxtaposed scales; no conical tubercles on the back of the thighs. Tail ending in a claw-like horny scute. Uniform dark brown or black.

Length of shell 1 m. 23 centim.

Aldabra.

|                                               |                         |                                    |
|-----------------------------------------------|-------------------------|------------------------------------|
| <i>a.</i> ♂, stffid., skull & bones separate. | Aldabra.                |                                    |
| <i>b.</i> Yg., spir.                          | Aldabra.                | Sir Lambert Playfair [P.].         |
| <i>c.</i> Yg., spir.                          | Bred in the Seychelles. | Sir J. Hooker [P.].                |
| <i>d.</i> ♂, stffid., skull separate.         | ——?                     |                                    |
| <i>e.</i> ♀, stffid., skull separate.         | ——?                     |                                    |
| <i>f.</i> Hgr. ♂, stffid.                     | ——?                     |                                    |
| <i>g.</i> Yg., stffid.                        | ——?                     | Gen. Hardwicke [P.].               |
| <i>h, i.</i> ♂, shells.                       | ——?                     |                                    |
| <i>k.</i> Hgr. ♂, carapace & skel.            | ——?                     |                                    |
| <i>l.</i> Hgr. ♂, shell.                      | ——?                     |                                    |
| <i>m, n.</i> Yg., shells.                     | ——?                     |                                    |
| <i>o, p, q.</i> Ad. & hgr., skulls.           | ——?                     |                                    |
| <i>r.</i> Humeri, scapula, & femur.           | ——?                     |                                    |
| <i>s.</i> ♀, skel.                            | ——?                     | { (Types of <i>T. ponderosa</i> .) |
| <i>t.</i> Ad., pelvis.                        | ——?                     |                                    |

## 20. *Testudo gigantea*.

*Testudo gigantea*, Schweigg. *Prodr.* p. 58 (1814); *Dum. & Bibr.* ii. p. 120 (1835); *Hubrecht, Notes Leyd. Mus.* iii. p. 43 (1881).

Differs from the preceding in the more depressed shell, the depth of which is not more than half the length, the smoothness in the adult of the shields of the carapace, the shorter plastron which is not notched behind, and the divided supracaudal shield.

Aldabra.

*a.* ♂, shell. ———?

## 21. *Testudo hololissa*.

*Testudo hololissa*, Günth. *Gig. Land-Tort.* p. 39, pl. vii. (1877).

This form presents all the characters of *T. gigantea*, except that the supracaudal shield is undivided. Possibly both this and the preceding species are based upon individual variations of *T. elephantina*, which should then bear the name *T. gigantea*.

Aldabra.

*a.* ♀, stffid. Aldabra. (Type.)

22. *Testudo daudinii*.

*Testudo daudinii*, *Dum. & Bibr.* ii. p. 123 (1835); *Günth. Gig. Land-Tort.* p. 33, pls. iv. & v. (1877).

Shell more than twice as long as deep; carapace elongate, with smooth convex shields in the adult, anterior and posterior margins expanded, reverted, and notched between the shields; anterior profile of carapace nearly horizontal; supracaudal shield undivided, scarcely larger than the neighbouring marginals. Plastron short, truncated behind in the adult; width of the bridge only one third the length of the carapace. Otherwise as in *T. elephantina*.

Aldabra?

a. ♂, stfid., skull and limb-bones separate. — ?

23. *Testudo nigrita*.

*Testudo indica*, part., *Gray, Syn. Rept.* p. 9 (1831), and *Cat. Tort.* p. 5 (1844), and *Sh. Rept.* i. p. 6 (1855), and *Suppl.* p. 5 (1870).

— *nigrita*, *Dum. & Bibr.* ii. p. 80 (1835); *Günth. Phil. Trans.* clxv. p. 267 (1875), and *Gig. Land-Tort.* p. 69, pls. xxx., xxxi., xlii.-xliv. (1877).

— *planiceps*, *Gray, Cat. Sh. Rept.* i. p. 6, pl. xxxiv., and *Suppl.* p. 5.

— *elephantina*, *Strauch, Chelon. Stud.* p. 83 (1862).

— *elephantopus*, part., *Gray, Proc. Zool. Soc.* 1870, p. 708, pl. xli., and *App. Cat. Sh. Rept.* p. 3 (1872).

— *indica*, *Sowerby & Lear, Tort.* pl. vi. (1872).

*Elephantopus planiceps*, *Gray, Proc. Zool. Soc.* 1873, p. 724.

Shell rather thin, broad, not quite twice as long as deep, declivous in front and behind, anterior and posterior margins reverted and scalloped; anterior margin notched; no nuchal; supracaudal undivided; dorsal shields strongly grooved concentrically, even in the adult; vertebral shields much broader than long, at least as broad as costals. Plastron rather large, lobes narrowed, truncate in front, notched behind; width of the bridge about half the length of the carapace; median suture between the gulars, the pectorals, and the anals very short; axillary and inguinal small. Head small, with flat forehead; a pair of enlarged præfrontal shields, followed by a nearly equally large frontal; beak feebly hooked, bicuspid; edge of jaws feebly denticulated; alveolar surface of upper jaw with a strong median ridge; neck long. Limbs with unequal-sized, roundish, juxtaposed scales, one on the inner side of the fore limb near the elbow being much enlarged. Uniform black.

Length of shell 1 metre.

Galapagos Islands.

a. Yg., stfid.

b. Hgr., skel.

c, d, e. Yg., stfid.

Galapagos.

Galapagos.

— ?

Dr. A. Günther [P.].

|                 |      |                                 |
|-----------------|------|---------------------------------|
| f. Hgr., skel.  | —— ? |                                 |
| g. Yg., shell.  | —— ? | Dr. J. E. Gray [P.].            |
| h. ♂, carapace. | —— ? |                                 |
| i. Ad., skull.  | —— ? | (Type of <i>T. planiceps</i> .) |

#### 24. *Testudo nigra*.

*Testudo nigra*, Quoy & Gaim. *Voy. Uranie et Physic.*, Zool. p. 172, pl. xl. (1824); Dum. & Bibr. ii. p. 115 (1835); Wieg. *N. Acta Leop.-Carol.* xvii. p. 188, pl. xiii. (1835); Strauch, *Chelon. Stud.* p. 85 (1862).

—— *californiana*, Quoy & Gaim. *Bull. Sc. Nat.* i. p. 90, pl. xi. (1824).

—— *elephantopus*, Harlan, *Journ. Ac. Philad.* v. p. 284 (1827); Günth. *Phil. Trans.* clxv. p. 261 (1875), and *Gig. Land-Tort.* p. 63, pls. xxx., xlii.-xliv., xlv., li.-liii. (1877).

—— *indica*, part., Gray, *Syn. Rept.* p. 9 (1831).

Shell thin, about twice as long as deep, with the upper anterior profile subhorizontal in the male; shields concentrically striated, but less strongly than in the preceding species. Plastron truncate behind. Otherwise as in the preceding.

Galapagos Islands (S. Albemarle).

|                |            |                         |
|----------------|------------|-------------------------|
| a. Hgr., skel. | Galapagos. | Capt. E. M. Leeds [P.]. |
|----------------|------------|-------------------------|

#### 25. *Testudo vicina*.

*Testudo vicina*, Günth. *Phil. Trans.* clxv. p. 277 (1875), and *Gig. Land-Tort.* p. 73, pls. xlvii. & liv. (1877).

Intermediate between *T. nigrita* and *T. microphyes*. Shell rather narrow, depressed, with the upper anterior profile subhorizontal in the male; shields striated. Plastron constricted in front and excised behind.

Galapagos Islands (S. Albemarle).

|                                  |                            |                         |            |
|----------------------------------|----------------------------|-------------------------|------------|
| a. Ad., skull.                   | Iguana Cove, S. Albemarle. | Commander Cookson [C.]. | } (Types.) |
| b. Ad., skel.                    | —— ?                       |                         |            |
| c. Yg., stffid., skull separate. | —— ?                       |                         |            |

#### 26. *Testudo microphyes*.

*Testudo microphyes*, Günth. *Phil. Trans.* clxv. p. 275 (1875), and *Gig. Land-Tort.* p. 78, pls. xxxii.-xxxviii., & xlii.-xlv. (1877).

Shell thin, about twice as long as deep, declivous in front in the female, narrowed in front and with nearly horizontal profile in the male, margin feebly reverted in front and behind; no nuchal; supracaudal undivided; dorsal shields quite smooth in the adult; vertebral shields much broader than long, at least as broad as costals. Plastron with broad bridge and short and narrow lobes, the hinder of which is truncate in the adult male; median suture



between the gulars, the pectorals, and the anals very short; axillary rather small, inguinal much larger. Head moderate, with flat forehead; prefrontal and frontal shields small; beak feebly hooked, bicuspid; edge of jaws feebly denticulated; alveolar surface of upper jaw with a strong median ridge, which is nearly equidistant from the outer and the inner border. Neck long. Limbs with unequal-sized, roundish, juxtaposed scales, one on the inner side of the fore limb near the elbow being much enlarged. Uniform black.

Length of shell 84 centim.

Galapagos Islands (North Albemarle).

|                                               |                           |                         |
|-----------------------------------------------|---------------------------|-------------------------|
| <i>a.</i> ♀, stffd., skull separate.          | Galapagos.                | (Type.)                 |
| <i>b, c, d.</i> ♂ ♀, stffd., skulls separate. | Tagus Cove, N. Albemarle. | Commander Cookson [C.]. |
| <i>e.</i> ♂, skel.                            | Tagus Cove, N. Albemarle. | Commander Cookson [C.]. |

## 27. *Testudo ephippium*.

*Testudo ephippium*, *Günth. Phil. Trans.* clxv. p. 271 (1875), and *Gig. Land-Tort.* p. 81, pls. xxxix. & xlii.-xliv. (1877).

Intermediate between the preceding and the following. Carapace as in the former. Bridge narrower, its width contained about twice and a half in the length of the carapace. Median ridge of upper jaw much nearer the inner than the outer edge.

Galapagos Islands (Charles Island).

|                       |     |
|-----------------------|-----|
| <i>a.</i> Yg., stffd. | — ? |
|-----------------------|-----|

## 28. *Testudo abingdonii*.

*Testudo abingdonii*, *Günth. Gig. Land-Tort.* p. 85, pls. xl., xli., xlv., & xlviii.-l. (1877).

Shell (of male) extremely thin and light, with the surface deeply pitted and grooved from the deficiency of osseous substance, much narrowed and compressed anteriorly, with ascending upper profile; otherwise as in the preceding. Plastron small; width of bridge about one third the length of the carapace; axillary and inguinal small. Head very small, neck very long; snout very short; forehead flat; beak feebly hooked, bicuspid; median alveolar ridge of upper jaw much nearer the inner than the outer border. Scales on limbs small. Black; horny sheath of jaws whitish.

Length of shell 97 centim.

Galapagos Islands (Abingdon Island).

|                                             |              |                                     |
|---------------------------------------------|--------------|-------------------------------------|
| <i>a, b, c.</i> ♂, stffd., skulls separate. | Abingdon Id. | Commander Cookson [C.].<br>(Types.) |
|---------------------------------------------|--------------|-------------------------------------|

29. *Testudo indica*.

*Perrault, Mém. Hist. Nat. Anim.* p. 193, pls. — (1676).

*Testudo indica*, *Schneid. Schildkr.* p. 355 (1783); *Schoepff, Test.* p. 101, pl. xxii. fig. A (1792); *Günth. Gig. Land-Tort.* p. 42 (1877).

— *indica*, part., *Daud. Rept.* ii. p. 280 (1802); *Gray, Syn. Rept.* p. 9 (1831), and *Cat. Tort.* p. 5 (1844), and *Sh. Rept.* i. p. 6 (1855).

— *perraultii*, *Dum. & Bibr.* ii. p. 126 (1835).

Carapace thin, thickened towards the margin, smooth, depressed, with the upper profile straight, not declivous in front; no nuchal; supracaudal undivided. Plastron short; gular shield single, small.

Length of shell 80 centim.

Mauritius (extinct).

30. *Testudo triserrata*.

? *Testudo graii*, *Dum. & Bibr.* ii. p. 135 (1835).

*Testudo triserrata*, *Günth. Ann. & Mag. N. H.* (4) xi. p. 397 (1873), and *Gig. Land-Tort.* p. 44, pls. xxiii.–xxix. (1877); *Haddon, Tr. Linn. Soc.* (2) ii. p. 156, pl. xiii. (1881).

Distinguished from the preceding in the upper profile of the carapace being undulated, slightly declivous in front. Alveolar surface of upper jaw with two median ridges.

Mauritius (extinct).

|                     |                  |                           |            |
|---------------------|------------------|---------------------------|------------|
| Skull and plastron. | Mare aux Songes. | E. Newton, Esq. [P.]      | } (Types.) |
| Various bones.      | Mare aux Songes. | Col. A. E. H. Anson, [P.] |            |

31. *Testudo inepta*.

*Testudo inepta*, *Günth. Ann. & Mag. N. H.* (4) xi. p. 397 (1873), and *Gig. Land-Tort.* p. 44, pls. xxiii.–xxviii. (1877); *Haddon, Tr. Linn. Soc.* (2) ii. p. 156, pl. xiii. (1881).

Shell higher than in the preceding, with the upper profile convex, declivous in front. Alveolar surface of upper jaw with a single median ridge.

Mauritius (extinct).

|                          |                  |                          |            |
|--------------------------|------------------|--------------------------|------------|
| Skull.                   | Mare aux Songes. | E. Newton, Esq. [P.]     | } (Types.) |
| Skull and various bones. | Mare aux Songes. | Col. A. E. H. Anson [P.] |            |
| Carapace.                | Mare aux Songes. | L. Bouton, Esq. [P.]     |            |
| Pelvis.                  | Mare aux Songes. |                          |            |

*Testudo leptocnemis*, *Günth. Gig. Land-Tort.* p. 50, pl. xxix. fig. B, is known from scapula, pelvis, and femur only, the latter bones being more slender than in *T. triserrata* and *inepta*. These remains, from the District of Flacq, Mauritius, presented by L. Bouton, Esq., form part of the collection.

32. *Testudo vosmaeri*.

- Testudo indica*, Vosmaeri, *Schoepff, Test.* p. 103, pl. xxii. fig. B (1792).  
 — *indica*, part., *Daud. Rept.* ii. p. 280 (1802); *Gray, Syn. Rept.* p. 9 (1831), and *Cat. Tort.* p. 5 (1844), and *Sh. Rept.* i. p. 6 (1855).  
 — *vosmaeri*, *Fitzing, N. Class. Rept.* p. 44 (1826); *Dum. & Bibr.* ii. p. 140 (1835); *Günth. Gig. Land-Tort.* p. 52, pls. xxi.-xxix. (1877); *Hubrecht, Notes Leyd. Mus.* iii. p. 41 (1881); *Haddon, Tr. Linn. Soc.* (2) ii. p. 159 (1881).  
 — *peltastes*, *Dum. & Bibr.* ii. p. 138.  
*Chersina peltastes*, *Strauch, Chelon. Stud.* p. 23 (1862).  
 — *vosmaeri*, *Strauch, l. c.*  
*Testudo rodericensis*, *Günth. Ann. & Mag. N. H.* (4) xi. p. 397 (1873).  
 — *boutonii*, *Günth. Nature*, 1875, p. 297.

Agreeing with the preceding species in the absence of nuchal shield and the undivided gular; distinguished by the extremely thin carapace, which is not declivous in front in the male, and without vertebral humps. Alveolar surface of upper jaw with a single median ridge.

Rodriguez (extinct).

Shells, skulls, and numerous bones.  
 Various bones.

'Transit of Venus' Expedition.  
 L. Bouton, Esq. [P.]. (*T. boutonii*.)

Cast of skull in Paris Museum.

Prof. Vaillant [P.].

33. *Testudo elongata*.

- Testudo elongata*, *Blyth, Journ. As. Soc. Beng.* xxii. p. 639 (1853); *Gray, Proc. Zool. Soc.* 1856, p. 181, pl. ix., and 1861, p. 139; *Günth. Rept. Brit. Ind.* p. 8 (1864); *Theob. Cat. Rept. Brit. Ind.* p. 3 (1876); *Anders. Zool. Res. Yunnan*, p. 706 (1879).  
*Peltastes elongatus*, *Gray, Proc. Zool. Soc.* 1869, p. 171, and *Suppl. Cat. Sh. Rept.* i. p. 9 (1870).

Shell considerably depressed, more than twice as long as deep, with flat vertebral region; anterior and posterior margins slightly reverted, strongly serrated in young, feebly in old specimens; shields concentrically striated, except in old specimens; nuchal present (rarely absent), narrow and elongate; supracaudal undivided, more or less incurved; first vertebral usually nearly as long as broad in the adult, the others broader than long and nearly as broad as the costals. Plastron large, truncate anteriorly, deeply notched posteriorly; suture between the pectoral shields as long as or longer than that between the humerals; suture between the gulars as long as or a little shorter than that between the pectorals; anals forming a very short suture, or entirely separated by the anal notch; axillary and inguinal moderate. Head moderate; a pair of large præfrontal shields, usually followed by a nearly equally large frontal; beak feebly hooked, tricuspid; alveolar ridge of upper jaw short and rather feeble. Anterior face of fore limbs with moderate, unequal-

sized, imbricate scales, which are largest towards the outer side; no enlarged tubercles on the thighs; tail ending in a claw-like horny tubercle. Carapace and plastron greenish yellow, each shield with an irregular black spot or blotch, which may occupy its greater portion, or may be much broken up or indistinct.

Length of shell 27 centim.

Bengal (Chaibassa), Burma, Camboja, Cochinchina.

|                                     |                |                         |
|-------------------------------------|----------------|-------------------------|
| <i>a, b, c, d, e, f.</i> ♂ ♀,       | Burma.         |                         |
| stfld.                              |                |                         |
| <i>g.</i> ♂, skel.                  | Burma.         |                         |
| <i>h.</i> Hgr., shell.              | Burma.         | W. Theobald, Esq. [C.]. |
| <i>i-l.</i> ♀, hgr., & yg., spir.   | Bhamo.         | M. L. Fea [C.].         |
| <i>m.</i> Yg., spir.                | Pegu.          | W. Theobald, Esq. [C.]. |
| <i>n, o, p.</i> Hgr. & yg., shells. | Pegu.          | W. Theobald, Esq. [C.]. |
| <i>q, r.</i> ♂ ♀, shells.           | Mergui.        | Prof. Oldham [P.].      |
| <i>s, t.</i> ♂ ♀, stfld.            | Camboja.       | M. Mouhot [C.].         |
| <i>u.</i> Hgr., shell.              | Camboja.       | M. Mouhot [C.].         |
| <i>v, w.</i> Yg., stfld.            | Lao Mountains. | M. Mouhot [C.].         |
| <i>x.</i> ♀, stfld.                 | Cochinchina.   |                         |

### 34. *Testudo forstenii*.

*Testudo forstenii*, Schleg. & Müll. in Temminck, *Verh. Nat. Nederl. Ind.* p. 30 (1844).

*Peltastes forstenii*, Gray, *Proc. Zool. Soc.* 1872, p. 615, pl. xliii., and *App. Cat. Sh. Rept.* p. 5 (1872).

Very closely allied to *T. elongata*, from which it differs only in the absence of a nuchal shield, and the smaller pectoral shields; the suture between the latter measures only half that between the humerals.

Length of shell 17 centim.

Celebes and Gilolo.

*a.* ♀, stfld. Boliahoeta, N. Salamatta, Celebes. Dr. A. B. Meyer [C.].

### 35. *Testudo marginata*.

*Testudo marginata*, Schoepff, *Test.* p. 52, pl. xi. (1792); *Daud. Rept.* ii. p. 233 (1802); *Bory & Bibr. Expéd. Morée, Rept.* p. 57, pl. vii. fig. 2 (1833); *Dum. & Bibr.* ii. p. 37 (1835); *Gray, Cat. Tort.* p. 9 (1844), and *Sh. Rept.* i. p. 11 (1855); *Sowerby & Lear, Tort.* pl. xv. (1872); *Lortet, Arch. Mus. Lyon*, iv. p. 7, pls. iii. & iv. (1887).

— *graja*, Hermann, *Observ. Zool.* p. 219 (1804).

*Chersine marginata*, Merr. *Tent.* p. 31 (1820).

*Chersus marginatus*, Wagl. *Syst. Amph.* p. 138 (1830); *Bonap. Icon. Faun. Ital.* pl. — (1840).

*Testudo campanulata*, Strauch, *Chelon. Stud.* p. 65 (1862), and *Verth. Schildkr.* p. 12 (1865).

*Peltastes marginatus*, Gray, *Proc. Zool. Soc.* 1869, p. 173, and *Suppl. Cat. Sh. Rept.* i. p. 10 (1870).

*Testudo nemoralis*, Schreib. *Herp. Eur.* p. 557 (1875).

Shell of adult elongate, at least twice as long as deep, with the posterior margin very strongly expanded and more or less serrated; nuchal border feebly notched; nuchal shield elongate, narrow; supracaudal undivided, spread out like the marginals; dorsal shields concentrically striated, sometimes convex; second vertebral shield usually longer than third, the width of which equals that of the corresponding costals. Plastron large, hind lobe notched behind and movable in the adult; suture between the humerals usually not longer than that between the pectorals or the gulars; suture between the anals as long as or longer than that between the abdominals; axillary and inguinal moderate. Head moderate; a large præ-frontal shield, followed by a nearly equally large frontal; beak feebly hooked; alveolar ridge of upper jaw rather short and feeble. Anterior face of fore limb with large imbricate scutes, forming four or five longitudinal and five or six transverse series; no enlarged tubercle on the hinder side of the thigh. Coloration very similar to that of *T. ibera*; carapace of adult usually black, each shield with a small yellow or greenish spot; plastron yellowish, each shield with a large black spot, which is usually triangular, the base of the triangle occupying the anterior border of the shield.

Length of shell 28 centim.

Greece.

|                   |         |                  |
|-------------------|---------|------------------|
| a. ♂, stfid.      | Athens. | Dr. Lortet [P.]. |
| b. ♂, shell.      | Greece. |                  |
| c, d. ♂ ♀, stfid. | — ?     |                  |
| e. ♂, skel.       | — ?     |                  |
| f. ♀, carapace.   | — ?     |                  |

### 36. Testudo leithii.

*Testudo marginata*, part., *Dum. & Bibr.* ii. p. 37 (1835); *Gray, Cat. Tort.* p. 9 (1844), and *Sh. Rept.* i. p. 11 (1855).

— *leithii*, *Günth, Proc. Zool. Soc.* 1869, p. 502, figs.

*Peltastes leithii*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 11 (1870).

*Testudo kleinmanni*, *Lortet, Arch. Mus. Lyon*, iii. p. 188 (1883), and iv. p. 11, pl. v. (1887).

Very closely allied to *T. marginata*, but much smaller and differing in the following points:—Carapace shorter, not twice as long as deep, deeply notched anteriorly; nuchal shield triangular; posterior border of supracaudal forming an angle, projecting beyond the marginals. Anterior face of fore limb covered with a few extremely large imbricate scutes disposed in three longitudinal and five transverse series. Carapace yellow or yellowish, each shield bordered anteriorly and laterally with blackish brown; plastron yellow, each abdominal shield with a dark brown triangular or cuneiform marking.

Length of shell 12 centim.

Sind\*; Lower Egypt and neighbouring part of Syria.

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\* The fact that the species has not been rediscovered in Sind renders it possible that it is not indigenous. Dr. Leith's specimen may have been purchased by him in Sind, or may have been imported.



|               |             |                                                        |
|---------------|-------------|--------------------------------------------------------|
| a. ♀, stffld. | Sind.       | Dr. Leith [P.]. (Type.)                                |
| b. ♀, spir.   | Alexandria. | Dr. Lortet [P.]. (As typical of <i>T. kleimanni</i> .) |
| c. ♂, shell.  | — ?         | Dr. J. E. Gray [P.].                                   |

37. *Testudo ibera*.

*Testudo pusilla* (*non L.*), *Shaw, Zool.* iii. p. 53 (1802); *Strauch, Erp. Alg.* p. 14 (1862), and *Chelon. Stud.* p. 67 (1862), and *Verth. Schildkr.* p. 14 (1865); *Boettg. Abh. Senckenb. Ges.* ix. p. 123 (1874).

— *græca*, part., *Daud. Rept.* ii. p. 218 (1802); *Gray, Cat. Tort.* p. 9 (1844), and *Sh. Rept.* i. p. 10 (1855).

— *ibera*, *Pallas, Zoogr. Ross.-As.* iii. p. 19 (1831); *Eichw. Zool. Spec. Ross. Pol.* iii. p. 196 (1831), and *Faun. Casp.-Cauc.* p. 47, pls. vi. & vii. (1841); *Blanf. Zool. E. Pers.* p. 306 (1876); *Lortet, Arch. Mus. Lyon*, iv. p. 3, pl. i. (1887).

— *ecaudata*, *Pall. l. c.*

— *græca*, *Bell, Mon. Test.* pl. — (1835).

— *mauritanica*, *Dum. & Bibr.* ii. p. 44 (1835).

— *whitei*, *Bennett, White's Nat. Hist. Selborne*, p. 361 (1836).

*Peltastes græcus*, part., *Gray, Proc. Zool. Soc.* 1869, p. 173, and *Suppl. Cat. Sh. Rept.* i. p. 12 (1870).

— *marginatus*, var. *whitei*, *Gray, Suppl.* p. 11.

— *mauritanicus*, *Gray, Hand-l. Sh. Rept.* p. 12 (1873).

Shell usually not twice as long as deep, with the posterior margin feebly expanded; in old specimens, however, it is more elongate and the posterior margin assumes a shape somewhat similar to that of *T. marginata*; nuchal shield narrow, elongate; supracaudal undivided, never spread out and subhorizontal as in *T. marginata*; vertebral shields broader than long, as broad as the costals. Plastron large, hind lobe notched behind and movable in the adult; suture between the humerals much longer than that between the pectorals; suture between the anals nearly as long as, or longer than, that between the abdominals; axillary and inguinal small. Head as in *T. marginata*; præfrontal shield sometimes divided longitudinally. Anterior face of fore limb with large imbricate scutes, forming four or five longitudinal and five or six transverse series; a large subconical tubercle on the hind side of the thigh. Carapace of young yellowish or pale olive, each shield spotted and bordered with black; the black spots more irregular and predominating in the adult; some specimens uniform brownish; plastron more or less spotted with blackish.

Length of shell 23 centim.

North-west Africa, Syria, Asia Minor, Transcaucasia, Persia.

|                 |                         |                           |
|-----------------|-------------------------|---------------------------|
| a. ♀, stffld.   | Mogador.                |                           |
| b. ♀, skel.     | Mogador.                |                           |
| c. Yg., spir.   | Valley of the Meander.  | R. McAndrew, Esq. [P.].   |
| d-e. Yg., spir. | Xanthus.                |                           |
| f. ♀, spir.     | Aralych, Transcaucasia. | St. Petersburg Mus. [E.]. |

|                                  |                                             |                              |
|----------------------------------|---------------------------------------------|------------------------------|
| <i>g, h.</i> Hgr. & yg., shells. | Between Chah Suguti and Duruh, N.E. Persia. | Gen. Goldsmid [P.].          |
| <i>i.</i> ♀, stfild.             | Karman, S.E. Persia.                        | W. T. Blanford, Esq. [C.].   |
| <i>k-l.</i> Yg., spir.           | Karman, S.E. Persia.                        | W. T. Blanford, Esq. [C.].   |
| <i>m, n.</i> ♂ ♀, stfild.        | —?                                          | Dr. J. E. Gray [P.].         |
| <i>o.</i> ♀, shell.              | —?                                          | Mrs. Christopher [P.].       |
|                                  |                                             | (Type of <i>T. whitei</i> .) |
| <i>p.</i> ♀, shell.              | —?                                          |                              |

38. *Testudo græca*.

*Testudo græca*, Linn. *S. N.* i. p. 352 (1766); *Schoepff, Test.* p. 38, pls. viii. & ix. (1792); *Hermann, Observ. Zool.* p. 219 (1804); *Bory and Bibron, Expéd. Morée, Rept.* p. 58, pl. vii. fig. 1, & pl. ix. fig. 4 (1833); *Bonap. Icon. Faun. Ital.* (1834); *Dum. & Bibron.* ii. p. 49 (1835); *Strauch, Chelon. Stud.* p. 73 (1862), and *Verth. Schildkr.* p. 16 (1865); *Schreib. Herp. Eur.* p. 550 (1875); *Lortet, Arch. Mus. Lyon*, iv. p. 5, pls. ii. & iii. fig. 1 (1887).

— *hermanni*, Gmel. *Syst. Nat.* p. 1041 (1789).

— *græca*, part., *Daud. Rept.* ii. p. 218 (1802); *Gray, Cat. Tort.* p. 9 (1844), and *Sh. Rept.* i. p. 10 (1855).

*Peltastes græcus*, part., *Gray, Proc. Zool.* 1833, p. 173, and *Suppl. Cat. Sh. Rept.* i. p. 12 (1870).

*Chersinella græca*, *Gray, Proc. Zool. Soc.* 1873, p. 725, pl. ix. fig. 4.

Carapace moderately convex, not or but very feebly expanded posteriorly, not serrated; nuchal elongate; supracaudal divided above, incurved in male; dorsal shields concentrically striated; vertebrals considerably narrower than costals; fifth vertebral, however, very broad, much broader than the others. Plastron large, notched behind; suture between the pectoral shields not half as long as that between the humerals; suture between the anals as long as or longer than that between the humerals; axillary and inguinal small. Head as in the preceding species. Scaling on front of fore limbs comparatively small, the scales, which are larger towards the outer side, forming seven to ten longitudinal series; no conical tubercle on the hinder side of the thigh; tail ending in a claw-like horny tubercle. Shell bright yellow, dorsal and marginal shields spotted and bordered with black; a broad black band along each side of the plastron.

Length of shell 14 centim.

Balearic Islands, Corsica, Sardinia, Sicily, Italy, Dalmatia, Balkan Peninsula, Greek archipelago, Syria.

|                      |                 |                      |
|----------------------|-----------------|----------------------|
| <i>a.</i> ♂, spir.   | Antakia, Syria. | Dr. Lortet [P.].     |
| <i>b.</i> ♂, stfild. | —?              | Dr. J. E. Gray [P.]. |
| <i>c.</i> ♀, stfild. | —?              | Gen. Hardwicke [P.]. |
| <i>d.</i> ♂, shell.  | —?              | Gen. Hardwicke [P.]. |
| <i>e.</i> ♀, shell.  | —?              |                      |

Under the name of *Testudo græca bettai*, Lataste has described, *Le Natur.* 1881, p. 396, an old specimen, of unknown origin, which appears to be an anomalous *T. græca*, approaching in some respects

*T. ibera*. It is characterized as follows:—Plastron movable posteriorly; supracaudal divided; tail ending in a horny spur; four claws to the fore limbs and three to the hind limbs; no conical tubercle on the back of the thigh.

### 39. *Testudo horsfieldii*.

*Testudo horsfieldii*, *Gray, Cat. Tort.* p. 7 (1844), and *Sh. Rept.* i. p. 7, pl. i. (1855); *Günth. Rept. Brit. Ind.* p. 7 (1864).

*Homopus barnesii*, *Blyth, Journ. As. Soc. Beng.* xxii. p. 642 (1854).

*Testudo* (*Homopus*) *horsfieldii*, *Strauch, Chelon. Stud.* p. 86 (1862), and *Verth. Schildkr.* p. 34 (1865).

*Testudinella horsfieldii*, *Gray, Suppl. Cat. Sh. Rept.* i. p. 12 (1870).

*Homopus horsfieldii*, *Theob. Cat. Rept. Brit. Ind.* p. 3 (1876).

Shell considerably depressed, not much longer than broad, at least twice as long as deep; nuchal border not or but very slightly notched; hind margin not or but very feebly reverted, not serrated; nuchal shield present, narrow; supracaudal undivided; dorsal shields more or less distinctly striated; vertebrals much broader than long, nearly as broad as costals. Plastron large, notched behind, flat in both sexes; gular shields usually as long as their distance from the pectorals; suture between the anals as long as or longer than that between the femorals; axillary and inguinal small. Head moderate; beak feebly hooked, tricuspid; alveolar ridge of upper jaw rather short and feeble. Both pairs of limbs with four claws; anterior face of fore limbs with large imbricate scutes, forming five or six longitudinal series; a group of enlarged conical tubercles on the hind side of the thigh; tail ending in a horny claw-like tubercle. Brown or olive above, uniform or blotched with black; plastron with large patches of black, which may cover it nearly entirely.

Length of shell 20 centim.

Central Asia, from the Aralo-Caspian district and the Kirghiz Steppes to Afghanistan.

|                        |                      |                                    |
|------------------------|----------------------|------------------------------------|
| <i>a.</i> ♀, stfid.    | Afghanistan.         | East India Company [P.]<br>(Type.) |
| <i>b.</i> ♀, stfid.    | Afghanistan.         |                                    |
| <i>c.</i> ♂, stfid.    | Gulran, Afghanistan. | Dr. Aitchison [C.].                |
| <i>d-g.</i> Yg., spir. | Gulran, Afghanistan. | Dr. Aitchison [C.].                |
| <i>h.</i> ♂, spir.     | Turkestan.           | Dr. A. Günther [P.].               |
| <i>i.</i> ♂, spir.     | Tschinas, Turkestan. |                                    |
| <i>k.</i> Yg., spir.   | Tschinas, Turkestan. | St. Petersburg Mus. [E.].          |
| <i>l.</i> ♀, spir.     | Amu Daria.           | St. Petersburg Mus. [E.].          |

### 40. *Testudo angulata* \*.

*Testudo angulata*, *Schweigg. Prodr.* p. 52 (1814); *Bell, Mon. Test.* pl. — (1835); *Dum. & Bibr.* ii. p. 150 (1835).

\* The account of the coloration of the soft parts given by Gray, *Proc. Zool. Soc.* 1866, p. 306, and *Suppl. Cat. Sh. Rept.* p. 13, is based upon a specimen made up of the shell of this species and the head and limbs of a *Nicoria punctularia*!

*Testudo bellii*, Gray, *Spicil. Zool.* p. 2, pl. iv. fig. 3 (1830).  
*Chersina angulata*, Gray, *Syn. Rept.* p. 15, pls. i. & ii. (1831), and  
*Cat. Tort.* p. 11 (1844), and *Sh. Rept.* i. p. 12 (1855); *Strauch*,  
*Chelon. Stud.* p. 49 (1862), and *Verth. Schildkr.* p. 36 (1865);  
 Gray, *Proc. Zool. Soc.* 1873, pl. lx. fig. 6.

Carapace elongate, very convex, posterior border not or but feebly reverted; nuchal shield narrow, elongate; supracaudal single, incurved; dorsal shields strongly striated concentrically, except in old specimens; vertebrals as broad as or broader than costals. Plastron large, notched posteriorly; gular region much produced, truncate or rounded anteriorly; gular shield single, much longer than the suture between the humerals; suture between the pectorals short; suture between the anals as long as, or longer than, that between the femorals; entoplastral bone very small. Head moderate; a pair of large præfrontal shields, usually followed by a large frontal; beak feebly hooked, bi- or tricuspid; alveolar ridge of upper jaw very short and feeble. Scales on the front of the fore limb rather small, except a large one on the inner side near the elbow, and a series along the outer side. Shell yellow, each dorsal shield with a black border and usually a black central spot; plastron black in the middle, or with some large black blotches.

Length of shell 19 centim.

South Africa.

|                                     |                    |                      |
|-------------------------------------|--------------------|----------------------|
| <i>a.</i> ♀, stffld.                | Cape of Good Hope. | R. Brown, Esq. [P.]. |
| <i>b.</i> Ad., shell.               | Cape of Good Hope. | R. Brown, Esq. [P.]. |
| <i>c.</i> ♂, stffld.                | Cape of Good Hope. | Dr. J. E. Gray [P.]. |
| <i>d, e.</i> ♀, spir.               | S. Africa.         |                      |
| <i>f, g.</i> ♀ & hgr., stffld.      | S. Africa.         |                      |
| <i>h, i.</i> Ad. & hgr., skels.     | S. Africa.         |                      |
| <i>k, l, m.</i> Ad. & hgr., shells. | S. Africa.         |                      |

#### 41. *Testudo yniphora*.

*Testudo yniphora*, *Vaillant, C. R. Ac. Sc.* ci. p. 440 (1885), and  
*Bull. Soc. Philom.* (7) ix. p. 118 (1885).

Carapace oval, posterior margin reverted and serrated; shields concentrically striated; nuchal minute. Gular region of plastron much produced as a flat point curving upwards; gular shield single; hind lobe openly emarginate; pectoral shields very narrow. Fore limb with broad imbricate tubercles. Carapace fulvous, areolæ yellow, each shield bordered with brown; each marginal shield with a triangular brown spot; plastron uniform yellow.

Length of shell 38 centim.

Island north-east of the Comoro group.

## Fam. 7. CHELONIDÆ.

- Cheloniadæ, *Gray, Ann. Phil.* (2) x. 1825.  
 Cheloniadæ, *Bell, Zool. Journ.* iii. 1828.  
 Oiacopodes, part., *Wagler, Syst. Amph.* 1830.  
 Cheloniadæ, part., *Gray, Syn. Rept.* 1831.  
 Thalassites, part., *Duméril & Bibron, Exp. Gén.* ii. 1835.  
 Cheloniadæ, part., *Gray, Cat. Tort.* 1884, and *Sh. Rept.* i. 1855.  
 Chelonioidæ, *Agassiz, Contr. N. H. U. S.* i. 1857.  
 Chelonina, *Strauch, Chelon. Stud.* 1862.  
 Cheloniadæ, *Gray, Suppl. Cat. Sh. Rept.* i. 1870.  
 Cheloniadæ, Caouanidæ, *Gray, Proc. Zool. Soc.* 1873, p. 395.  
 Cheloniidæ, *Cope, Proc. Amer. Philos. Soc.* xx. 1882, p. 143.

Nuchal plate without costiform processes. Plastral bones nine. Shell covered with epidermal shields. Caudal vertebræ procœlous. Neck incompletely retractile; cervical vertebræ short, mostly articulated by amphiarthrosis\*. Temple completely roofed over; parietal bone in contact with the squamosal. Limbs paddle-shaped; phalanges without condyles; claws one or two.

Marine.

## 1. CHELONE.

- Chelonia, part., *Brongn. Bull. Soc. Philom.* ii. p. 89 (1800); *Wagler, Syst. Amph.* p. 132 (1830); *Gray, Syn. Rept.* p. 51 (1831); *Dum. & Bibr.* ii. p. 530 (1835).  
 Caretta, part., *Merrim, Tent.* p. 17 (1820).  
 Caretta, *Gray, Cat. Tort.* p. 53 (1844), and *Sh. Rept.* i. p. 73 (1855); *Girard, U. S. Explor. Exped., Herp.* p. 438 (1858); *Günth. Rept. Brit. Ind.* p. 53 (1864); *Gray, Suppl.* p. 118 (1870).  
 Chelonia, *Gray, Cat. Tort.* p. 54, and *Sh. Rept.* i. p. 74; *Agass. Contr. N. H. U. S.* i. p. 377 (1857); *Girard, l. c.* p. 452; *Günth. l. c.* p. 52; *Gray, Suppl.* p. 119.  
 Eretmochelys (*Fitz.*), *Agassiz, l. c.* p. 380.  
 Euchelys, *Girard, l. c.* p. 447.  
 Chelone, *Strauch, Chelon. Stud.* p. 59 (1862).  
 Mydas, *Gray, Suppl.* p. 119.  
 Onychochelys, *Gray, Proc. Zool. Soc.* 1873, p. 397.

Carapace with persisting fontanelles between the costal and marginal plates. Costal shields four pairs. An intergular and a series of inframarginal plastral shields.

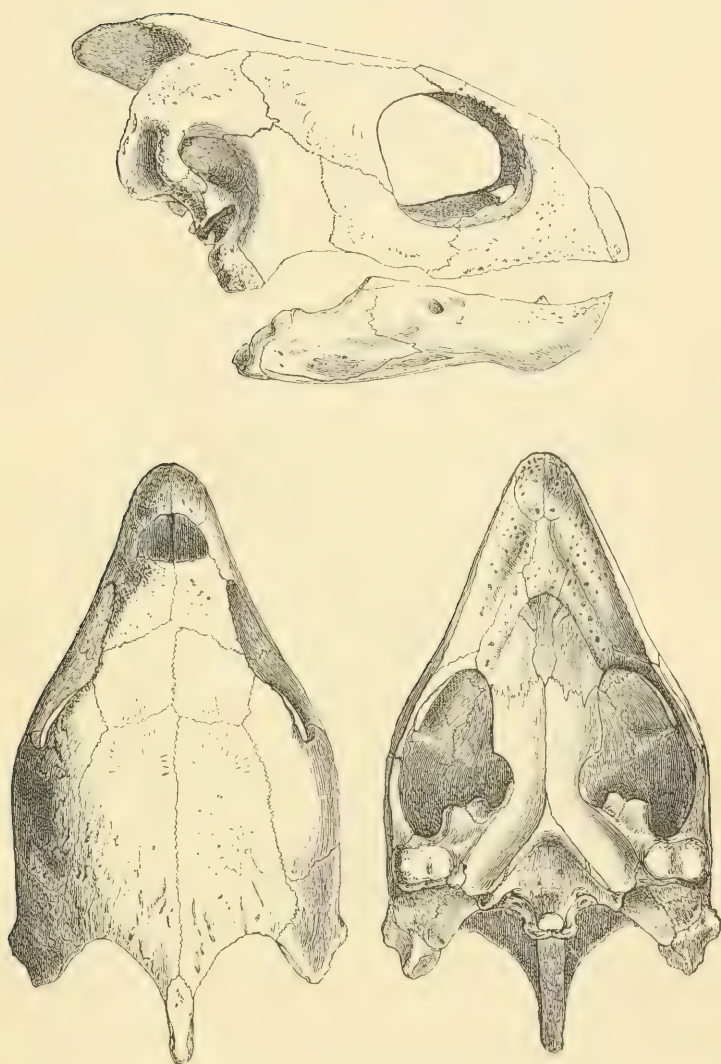
1. *Chelone mydas*.

- Testudo mydas*, *Linn. S. N.* i. p. 350 (1768); *Schoepff, Testud.* p. 73, pl. xvii. fig. 2 (1792); *Daud. Rept.* ii. p. 10, pl. xvi. fig. 1 (1802).  
 — *macropus*, *Walbaum, Chelonogr.* p. 112 (1782).  
 — *viridis*, *Schneid. Schildkr.* p. 299, pl. — (1783).  
 — *japonica*, *Thunberg, Vetensk. Acad. Handl.* viii. p. 178, pl. vii. fig. 1 (1787).  
 — *cepediana*, *Daud. l. c.* p. 50.  
*Chelonia japonica*, *Schweigg. Prodr.* p. 21 (1814).

\* In an adult example of *Chelone mydas* the sixth and seventh centra are even anchylosed together.



Fig. 45.



Skull of *Chelone imbricata*.

- Chelonia virgata*, *Schweigg. l. c.*; *Dum. & Bibr. ii. p. 541* (1835); *Cocteau, in R. de la Sagra, Hist. Cuba, Rept. p. 26, pl. iii.* (1843); *Gray, Cat. Tort. p. 54* (1844); *Cantor, Cat. Mal. Rept. p. 11* (1847); *Gray, Sh. Rept. i. p. 74* (1855); *Agass. Contr. N. H. U. S. i. p. 379* (1857); *Günth. Rept. Brit. Ind. p. 53* (1864).
- *mydas*, *Schweigg. l. c. p. 22*; *Gray, Syn. Rept. p. 52* (1831); *Dum. & Bibr. ii. p. 538*; *Holbr. N. Am. Herp. ii. p. 25, pl. iii.* (1842); *Agass. Contr. i. p. 378*; *Sowerby & Lear, Tort. pls. lix. & lx.* (1872); *Peters, Reise n. Mossamb. iii. p. 18* (1882).
- Caretta cepedii*, *Merr. Tent. p. 18* (1820).
- *esculenta*, *Merr. l. c.*
- *nasicornis*, *Merr. l. c.*
- *thunbergii*, *Merr. l. c.*
- Chelonia maculosa*, *Cuv. R. A. 2nd ed. ii. p. 13* (1829); *Dum. & Bibr. ii. p. 544.*
- *lachrymata*, *Cuv. l. c.*
- *viridis*, *Temm. & Schleg. Faun. Japon., Rept. p. 18, pls. iv. & vi.* (1833); *Cocteau, l. c. p. 19*; *Gray, Cat. Tort. p. 54, and Sh. Rept. i. p. 75*; *Girard, U. S. Explor. Exped., Herp. p. 453* (1858); *Gray, Proc. Zool. Soc. 1873, p. 402.*
- *bicarinata*, *Lesson, in Bélang. Voy. Ind. Or., Zool. p. 301* (1834).
- *marmorata*, *Dum. & Bibr. ii. p. 546, pl. xxiii. fig. 1*; *Girard, l. c. p. 455, pl. xxxi. figs. 5-7.*
- Euchelys macropus*, *Girard, l. c. p. 448, pl. xxxi. figs. 9-11.*
- Chelonia formosa*, *Girard, l. c. p. 456, pl. xxxi. figs. 1-4.*
- *tenuis*, *Girard, l. c. p. 459, pl. xxxi. fig. 8.*
- Chelone macropus*, *Strauch, Chelon. Stud. p. 61* (1862).
- *virgata*, *Strauch, l. c. p. 183.*
- *viridis*, *Strauch, l. c. p. 185, and Verth. Schildkr. p. 141* (1865); *Schreib. Herp. Eur. p. 518* (1875).
- *maculosa*, *Strauch, Chelon. Stud. p. 186.*
- *marmorata*, *Strauch, l. c. p. 187.*
- Mydas viridis*, *Gray, Suppl. Cat. Sh. Rept. i. p. 119* (1870).
- Chelonia agassizii*, *Bocourt, Miss. Sc. Mex., Rept. p. 26, pl. vi.* (1870); *Garman, Bull. Mus. Comp. Zool. vi. p. 126* (1880).
- *depressa*, *Garman, l. c. p. 124.*
- *lata*, *Philippi, Zool. Gart. xxviii. p. 84* (1887).

Carapace feebly unicarinate in the young (sometimes with slight indication of lateral keels), arched or subteatiform in the adult; dorsal shields juxtaposed; margin not or but indistinctly serrated, formed of 25 shields. Snout very short; jaws not hooked; horny sheaths of upper jaw with feebly denticulated edge and striated inner surface, of lower jaw with strongly denticulated edge; alveolar surface of upper jaw with two denticulated strong ridges; symphysis of lower jaw short; one pair of prefrontal shields. Limbs usually with a single claw; the second digit sometimes provided with a distinct claw in young specimens. Young dark brown or olive above, the limbs margined with yellow; yellow inferiorly, with a large dark brown spot on the hand and foot. Carapace of adult olive or brown, spotted or marbled with yellowish.

Length of shell 1 m. 10 centim.

Tropical and subtropical seas.

*a.* Several specs., yg., Ascension Id.  
in spir.

Sir E. Belcher [P.].

|                                       |                             |                                     |
|---------------------------------------|-----------------------------|-------------------------------------|
| <i>b, c, d.</i> Ad., skulls.          | Ascension Id.               | — Waud, Esq. [P.].                  |
| <i>e.</i> Embryo, spir.               | Ascension Id.               | Commander Bedford Pym [P.].         |
| <i>f.</i> Hgr., stffd.                | Belize.                     | O. Salvin, Esq. [C.].               |
| <i>g.</i> Ad., skel.                  | W. Indies.                  |                                     |
| <i>h, i.</i> Hgr., stffd.             | Brazil.                     |                                     |
| <i>k.</i> Hgr., carapace & head.      | Zanzibar Id.                | Sir J. Kirk [P.].                   |
| <i>l-m.</i> Yg., spir.                | Malay Peninsula.            | Dr. Cantor.                         |
| <i>n.</i> Hgr., head & limbs in spir. | Formosa.                    | R. Swinhoe, Esq. [P.].              |
| <i>o.</i> Yg., spir.                  | N.W. Australia.             | Capt. Beckett [C.].                 |
| <i>p.</i> Ad., skull.                 | Booley Id., Torres Straits. | Dr. Coppinger [C.]; H.M.S. 'Alert.' |
| <i>q.</i> Ad., skull.                 | Clack Id., N.E. Australia.  | Dr. Coppinger [C.]; H.M.S. 'Alert.' |
| <i>r.</i> Yg., spir.                  | Bonin Id.                   | Smithsonian Institution.            |
| <i>s.</i> Ad., skel.                  | — ?                         |                                     |
| <i>t, u, v, w.</i> Ad., shells.       | — ?                         |                                     |
| <i>x.</i> Ad., disarticulated skull.  | — ?                         |                                     |

2. *Chelone imbricata*.

*Testudo imbricata*, *Linn. S. N.* i. p. 350 (1766); *Schneid. Schildkr.* p. 309 (1783); *Schoepff, Testud.* p. 72, pl. xviii. (1792).

— *caretta*, *Daud. Rept.* ii. p. 39, pl. xvii. fig. 2 (1802).

*Chelonia imbricata*, *Schweigg. Prodr.* p. 21 (1814); *Gray, Syn. Rept.* p. 52 (1831); *Temm. & Schleg. Faun. Japon., Rept.* p. 13, pl. v. (1833); *Dum. & Bibr. ii.* p. 548, pls. ii. & xxv. fig. 2 (1835); *Bell, Brit. Rept.* p. 1 (1839); *Holbr. N. Am. Herp.* ii. p. 39, pl. v. (1842); *Sowerby & Lear, Tort.* pls. lvii. & lviii. (1872).

*Caretta imbricata*, *Merr. Tent.* p. 19 (1820); *Gray, Cat. Tort.* p. 53 (1844), and *Sh. Rept.* i. p. 74 (1855); *Girard, U. S. Explor. Exped., Herp.* p. 440 (1857); *Gray, Proc. Zool. Soc.* 1873, p. 397.

*Chelonia pseudo-mydas*, *Lesson, in Bélang. Voy. Ind. Or., Zool.* p. 299 (1834).

— *pseudo-caretta*, *Lesson, l. c.* p. 302.

*Caretta bisca*, *Rüpp. N. Wirbelth. Abyss., Amph.* p. 4, pl. ii. (1835).

*Eretmochelys imbricata*, *Agass. Contr. N. II. U. S. i.* p. 381 (1857).

— *squamata*, *Agass. l. c.* p. 382.

*Caretta squamosa*, *Girard, l. c.* p. 442, pl. xxx. figs. 1-7.

— *rostrata*, *Girard, l. c.* p. 446, pl. xxx. figs. 8-13.

*Chelone imbricata*, *Strauch, Chelon. Stud.* p. 181 (1862), and *Verth. Schildkr.* p. 136 (1865); *Schreib. Herp. Eur.* p. 522 (1875).

*Caretta squamata*, *Günth, Rept. Brit. Ind.* p. 54 (1864).

*Onychochelys kraussi*, *Gray, Proc. Zool. Soc.* 1873, p. 398, figs.

Carapace tricarinate in the young, with the shields strongly imbricate, the vertebrals rhomboidal; dorsal shields of adult smooth, of old specimens juxtaposed; margin formed of 25 shields, more or less strongly serrated posteriorly. Snout compressed in the adult; jaws hooked, not or but very feebly denticulated on the margin; symphysis of lower jaw long; two pairs of shields anterior to the zygous frontal. Limbs with two claws. Young pale brown above, blackish below. Carapace of adult marbled yellow and dark brown,

plastron yellow; shields of head and limbs dark brown with yellow borders.

Length of shell 85 centim.

Tropical and subtropical seas.

|                                       |                    |                                           |
|---------------------------------------|--------------------|-------------------------------------------|
| <i>a.</i> Hgr., shell.                | Bahamas.           | Dr. A. Günther [P.].                      |
| <i>b.</i> Yg., shell.                 | Yzabal, Guatemala. | O. Salvin, Esq. [C.].                     |
| <i>c.</i> Ad., stffd.                 | French Guiana.     | Dr. Krauss [P.]. { (Types of              |
| <i>d.</i> Ad., skull.                 | French Guiana.     | Dr. Krauss [P.]. { <i>O. kraussi.</i> )   |
| <i>e.</i> Hgr., carapace.             | Atlantic Ocean.    | W. Eling, Esq. [P.].                      |
| <i>f.</i> Ad., stffd.                 | Muscat, Arabia.    | A. S. G. Jayakar, Esq. [P.].              |
| <i>g.</i> Yg., skel.                  | Formosa.           | R. Swinhoe, Esq. [C.].                    |
| <i>h.</i> Hgr., spir.                 | Celebes.           | Dr. A. B. Meyer [C.].                     |
| <i>i.</i> Hgr., spir.                 | Banda Sea.         | H.M.S. 'Challenger.'                      |
| <i>k.</i> Yg., stffd.                 | Indian Ocean.      | Sir J. Richardson [P.].                   |
| <i>l, m, n, o, p.</i> Hgr.,<br>stffd. | Indian Ocean.      |                                           |
| <i>q.</i> Yg., spir.                  | Duke of York Id.   | Rev. G. Brown [C.].                       |
| <i>r-s.</i> Yg., spir.                | Kei Id.            | Capt. Langen [P.].                        |
| <i>t.</i> Hgr., carapace.             | Darnley Id.        | Lord Derby [P.].                          |
| <i>u.</i> Yg., spir.                  | Aneiteum.          |                                           |
| <i>v.</i> Yg., spir.                  | Samoa.             | Rev. J. Powell [C.].                      |
| <i>w.</i> Hgr., stffd.                | Raine's Id.        | Capt. J. W. Ince [P.].                    |
| <i>x.</i> Hgr., stffd.                | Tehuantepec.       | F. Sumichrast [C.].                       |
| <i>y, z.</i> Hgr. & yg.,<br>skels.    | — ?                | F. D. Godman & O. Salvin,<br>Esqrs. [P.]. |

## 2. THALASSOCHELYS.

*Chelonia*, part., *Brong. Bull. Soc. Philom.* ii. p. 89 (1800); *Wagler, Syst. Amph.* p. 132 (1830); *Gray, Syn. Rept.* p. 51 (1831); *Dum. & Bibr.* ii. p. 530 (1835).

*Caretta*, part., *Merrem, Tent.* p. 17 (1820).

*Thalassochelys*, *Fitzing. Ann. Wien. Mus.* i. p. 121 (1835); *Agassiz, Contr. N. H. U. S.* i. p. 383 (1857); *Girard, U. S. Expl. Exped., Herp.* p. 429 (1858); *Strauch, Chelon. Stud.* p. 61 (1862).

*Caouana*, *Gray, Cat. Tort.* p. 52 (1844), and *Sh. Rept.* i. p. 72 (1855); *Günth. Rept. Brit. Ind.* p. 51 (1864); *Gray, Suppl.* p. 118 (1870).

*Lepidochelys* (*Fitz.*), *Girard, l. c.* p. 434; *Gray, Proc. Zool. Soc.* 1873, p. 406.

*Cephalochelys*, *Gray, l. c.* p. 408.

*Eremonia*, *Gray, l. c.*

*Colpochelys*, *Garman, Bull. Mus. Comp. Zool.* vi. p. 124 (1880).

Carapace completely ossified in the adult. Costal shields five pairs or more. A series of inframarginal plastral shields.

## 1. Thalassochelys caretta.

*Testudo caretta*, *Linn. S. N.* i. p. 351 (1768); *Walbaum, Chelonogr.* p. 95 (1782); *Schöppf, Testud.* p. 67, pls. xvi. & xvii. fig. 3 (1792).

— cephalo, *Schneid. Schildkr.* p. 303 (1783).

— caouana, *Daud. Rept.* ii. p. 55, pl. xvi. fig. 2 (1802).

- Chelonia caouana*, *Schweigg. Prodr.* p. 22 (1814); *Wagl. Syst. Amph.* pl. i. figs. i-xxvi (1830); *Dum. & Bibr.* ii. p. 552 (1835).  
*Caretta atra*, *Merr. Tent.* p. 17 (1820).  
 — cephalo, *Merr. l. c.*  
*Chelonia multiscutata*, *Kuhl, Beitr. Zool.* p. 78 (1820).  
 — olivacea, *Eschscholtz, Zool. Atl.* p. 3, pl. iii. (1829); *Cantor Cat. Mal. Rept.* p. 13 (1847).  
 — cephalo, *Temm. & Schleg. Faun. Japon., Rept.* p. 23, pls. iv. & vi. (1833); *Cocteau, in R. de la Sagra, Hist. Cuba, Rept.* p. 35 (1843).  
*Chelonia pelagorum*, *Val. in Bory, Expéd. Morée, Zool.* pl. vi. (1833).  
 — dussumieri, *Dum. & Bibr.* p. 557, pl. xxiv. fig. 1.  
*Caretta olivacea*, *Rüpp. N. Wirbelth. Abyss., Amph.* p. 7, pl. iii. (1835).  
*Chelonia caretta*, *Bonap. Faun. Ital.* (1835); *Holbr. N. Am. Herp.* ii. p. 33, pl. iv. (1842).  
*Caouana caretta*, *Gray, Cat. Tort.* p. 52 (1844), and *Sh. Rept. i.* p. 72 (1855), and *Proc. Zool. Soc.* 1873, p. 404.  
 — elongata, *Gray, Cat. Tort.* p. 53, and *Sh. Rept. i.* p. 73.  
 — olivacea, *Gray, Cat. Tort.* p. 53, and *Sh. Rept. i.* p. 73; *Günth. Rept. Brit. Ind.* p. 52 (1864).  
*Thalassochelys caouana*, *Agassiz, Contr. N. II. U. S. i.* p. 384, pl. vi. figs. 13-32 (1857).  
 — corticata, *Girard, U. S. Explor. Exped., Herp.* p. 431, pl. xxix. (1858); *Strauch, Chelon. Stud.* p. 187 (1862), and *Verth. Schildkr.* p. 146 (1865); *Schreib. Herp. Eur.* p. 513 (1875).  
*Lepidochelys olivacea*, *Girard, l. c.* p. 435; *Gray, Proc. Zool. Soc.* 1873, p. 407.  
 — dussumieri, *Girard, l. c.* p. 437.  
*Thalassochelys olivacea*, *Strauch, Chelon. Stud.* p. 63, and *Verth. Schildkr.* p. 147.  
 — elongata, *Strauch, Chelon. Stud.* p. 63.  
*Cephalochelys oceanica*, *Gray, Proc. Zool. Soc.* 1873, p. 408.  
*Eremonia elongata*, *Gray, l. c.* fig.  
*Thalassochelys tarapacana*, *Philippi, Zool. Gart.* xxviii. p. 84 (1887).

Carapace of young with three strong keels, of adult arched or subtectiform; dorsal shields juxtaposed; margin serrated posteriorly in the young, formed of 27, or rarely 25 shields. Intergular shield very small or absent. Head large, with very strong, hooked jaws; symphysis of lower jaw very long; alveolar surface of horny beak with a median ridge, of jaws without; two pairs of shields anterior to the zygous frontal. Limbs of young usually with two claws, of adult frequently with but one. Young uniform dark brown or blackish; adult brown above, yellowish inferiorly.

Length of shell 1 m. 5 centim.

Tropical and subtropical seas; Mediterranean; an accidental visitor in the North.

The enormous amount of variation in the large series of Logger-head Turtles in the Museum leaves no alternative but to further multiply the number of species, or to admit only one. I have adopted the latter course.

a, b, c, d. Hgr. & yg., stfdd. Atlantic Ocean.  
 e. Ad., shell. Coast of Devonshire. W. Wilson, Esq. [P.]



|                                          |                               |                                                   |
|------------------------------------------|-------------------------------|---------------------------------------------------|
| <i>f-g.</i> Embryos, spir.               | Little Cayman, W. I.          | Lieut. Carpenter [P.].                            |
| <i>h.</i> Ad., skel.                     | Rio Grande do Sul,<br>Brazil. | Dr. H. v. Ihering<br>[C.].                        |
| <i>i.</i> Ad., stffd.                    | Cape of Good Hope.            | Sir A. Smith [P.].                                |
| <i>k.</i> Ad., stffd.                    | Indian Ocean.                 |                                                   |
| <i>l-q.</i> Yg., spir.                   | Bay of Bengal.                | W. Theobald, Esq.<br>[C.].                        |
| <i>r.</i> Hgr., skull.                   | Ceylon.                       | Dr. J. Davy [P.].                                 |
| <i>s.</i> Yg., spir.                     | Philippines.                  |                                                   |
| <i>t.</i> Yg., spir.                     | Borneo.                       | Dr. Bleeker. ( <i>Ch.<br/>dubia</i> , Blkr.)      |
| <i>u.</i> Yg., spir.                     | Batavia.                      | Dr. Bleeker. ( <i>C. poly-<br/>aspis</i> , Blkr.) |
| <i>v-w.</i> Yg., spir.                   | Manado, Celebes.              | Dr. A. B. Meyer [C.].                             |
| <i>x.</i> Ad., stffd.                    | Shark's Bay, W.<br>Australia. | H.M.S. 'Herald.'                                  |
| <i>y-a.</i> Yg., dry.                    | Shark's Bay, W.<br>Australia. | H.M.S. 'Herald.'                                  |
| <i>β.</i> Ad., carapace.                 | Cape York.                    |                                                   |
| <i>γ-δ.</i> Yg., spir.                   | Mazatlan.                     | Mr. A. Forrer [C.].                               |
| <i>ε, ζ, η.</i> Hgr., stffd.             | — ?                           |                                                   |
| <i>θ, ι, κ, λ.</i> Hgr. & yg., skel.     | — ?                           | (Type of <i>Cephalo-<br/>chelys oceanica</i> .)   |
| <i>μ.</i> Head and fore limbs,<br>stffd. | — ?                           | (Type of <i>Couana<br/>elongata</i> .)            |
| <i>ν.</i> Ad., shell.                    | — ?                           | T. Bell, Esq. [P.].                               |
| <i>ξ.</i> Ad., skull.                    | — ?                           |                                                   |
| <i>ο.</i> Ad., skull.                    | — ?                           |                                                   |

## 2. *Thalassochelys kempii*.

*Thalassochelys* (*Colpochelys*) *kempii*, Garman, *Bull. Mus. Comp. Zool.* vi. p. 123 (1880).

Judging merely by the original description I should have felt inclined to doubt the specific distinctness of this Turtle. But from information kindly supplied me by Mr. Garman and Dr. Baur it appears that it is well distinguished from *T. caretta* by the presence of ridges on the alveolar surfaces of the jaws (underlying the horny sheaths) which closely resemble those of *Chelone imbricata*, and by the openings of the inner nostrils not being covered by the alveolar border.

Gulf of Mexico.

## Superfam. B. PLEURODIRA.

*Emydea monimopelyca*, *Stannius*, *Zoot. Amph.* 1854.

*Pleuroderes*, *Gray*, *Suppl. Cat. Sh. Rept.* i. 1870.

*Pleurodira*, *Cope*, *Proc. Amer. Assoc. Adv. Sc.* xix. 1870, p. 235.

*Peltochelyidæ*, part., *Seeley*, *Q. Journ. Geol. Soc.* xxxvi. 1880, p. 412.

*Paradiacostoidea*, part., *Baur*, *Zool. Anz.* 1887, p. 99.

Neck bending laterally; cervical vertebræ with strong transverse processes, the cup-and-ball articulation single throughout; centrum of the last cervical articulating with the centrum of the first dorsal. Mandible with an articular condyle fitting into a concavity of the quadrate; outer border of tympanic cavity completely encircled by the quadrate; pterygoids very broad throughout, forming wing-like lateral expansions, and in contact on the median line. Pelvis ankylosed to the carapace and plastron. Digits with not more than three phalanges. Epiplastra in contact with hyoplastra; entoplastron oval or rhomboidal. A complete series of marginal bones connected with the ribs.

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DORSAL VERTEBRAL COLUMN AND CARAPACE.—The number of vertebræ between the last cervical and the first caudal is ten or eleven in all recent Pleurodira, instead of twelve as in all Cryptodira; the reduction being due to the absence of true sacrals or to the presence of but a single one, although the last or the last two dorsals may assume, in the adult, the character of sacrals. The first dorsal centrum is proportionately more elongate than in the Cryptodira, and may equal the second in length. The centra are more or less compressed, except in *Chelys*, where they much expand towards each end for union with the proximally dilated extremities of the ribs. In the latter genus, the attachment of all the ribs except the first and last two is intervertebral; in the other genera, this is the case only with the second to fourth or fifth inclusively.

The nuchal is usually as long as broad, or longer than broad. The neural series rarely (*Sternotherus derbianus*) contains more than seven plates (*Chelys*, *Hydraspis*, *Hydromedusa*, *Pelomedusidæ* generally); there is a pretty complete gradation between such a series and their total absence (*Chelodina*, *Platemys*, *Emydura*, *Elseya*): if present, these plates are hexagonal, and short-sided in front. Costal plates normally number eight pairs; but in a specimen of *Pelomedusa* I find nine pairs, and in another nine plates on one side and the normal number on the other. The carapace is fully ossified in all adult Pleurodira, and the marginals number twenty-three, except in *Carettochelys*, which has only twenty-one. A single pygal is present, and in none of the recent forms does it come in contact with the neurals.

PLASTRON.—The nine usual bones compose the plastron in the Chelyidæ; in the Pelomedusidæ the number is increased to eleven, the additional elements being the mesoplastra, situated between the hyo- and hypoplastra. The plastron joins the carapace by suture, and the axillary and inguinal buttresses are usually strongly

developed, though never to such a degree as in the Cryptodiran Batagurs; they are very short in *Pelomedusa* and *Sternotherus*, and in the adult of the latter genus, in which the front plastral lobe is movable, in quite a vestigial condition, as in the Cryptodiran genera *Emys* and *Cistudo*. A more or less developed notch, or canal, is present in the axillary and inguinal buttresses of the plastron, at their junction with the marginals.

**CERVICAL VERTEBRÆ.**—The presence of well-developed transverse processes, situated behind the vertical of the præzygapophyses, and the absence of any ginglymoid articulations, distinguish the cervical vertebræ of the Pleurodira. It is also very frequently the case that the elements of the first vertebra unite into a single bone; the hypapophysis and the centrum (odontoid process) remain, however, distinct in *Podocnemis*, *Emydura*, and *Elseya*, and I have also found them so in *Hydraspis hilarii*. The mode of articulation of the cervical vertebræ is diagnostic of the families: thus, in the Pelomedusidæ, the second only is biconvex, the following being concavo-convex; in the Chelydidæ, the second, third, and fourth are convexo-concave, the fifth biconvex, the sixth concavo-convex, the seventh biconcave, and the eighth biconvex.

**CAUDAL VERTEBRÆ.**—They are procœlous and provided with well-developed transverse processes; the number is usually 16 to 18; 21 in *Podocnemis expansa*, 25 in *Emydura macquarieæ*. Chevron bones are absent.

**SKULL.**—The skull is much depressed, most so in *Chelys*, the extraordinary flatness of which gives it the appearance of having been crushed, least in *Podocnemis*. The orbit is bounded by the maxillary, the præfrontal, the jugal, and (except *Chelys*) the frontal. The præmaxillaries, which are fused to a single bone in *Chelys* alone, are well developed and bound the nasal opening. Nasal bones are distinct from the præfrontals in all Chelydidæ except *Chelys* \*. The frontals and the parietals are distinct, the latter bones being connected with the palate by descending processes. In the Chelydidæ the frontals are produced forwards, between the præfrontals, to the nasals, or to the nasal opening. A complete bony temporal roof is present only in *Podocnemis*, and its constitution differs greatly from that obtained in the Cryptodira; the postfrontal is comparatively small, and the parietal forms a long suture with the jugal and the quadratojugal. In the other Pelomedusidæ there is a well-developed zygomatic arch, formed by the postfrontal, the jugal, and the quadratojugal, the latter element separating the two former from the squamosal and the quadrate. In the Chelydidæ the zygomatic arch is absent, but a parieto-squamosal arch is present in all genera save *Chelodina*. In *Platemys*, *Emydura*, *Elseya*, and, to a lesser extent, in *Hydraspis*, the parietals expand into a supratemporal roof, the sides of the temples remaining, however, unprotected.

The supraoccipital is produced posteriorly beyond the parietals, and, together with the exoccipitals, bounds the *foramen magnum*,

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\* Brühl and Hoffmann, however, represent them in that genus.

which, as in the other Chelonians, is deeper than broad. In *Sternotherus* and *Pelomedusa* the basioccipital is completely excluded from the occipital condyle.

The quadrate forms a complete frame to the tympanum, rarely with a very small interruption posteriorly, but a part of the outer and the whole of the middle ear-chamber remain open, the stapes being entirely visible from behind. The quadrate presents a large concavity for the reception of the single condyle of the mandible, and the pterygoids extend to the very edge of that concavity. The quadrate forms a suture with the basisphenoid, except in *Chelys*, in which it is separated from the latter by the prootic; in *Podocnemis* it joins both the basisphenoid and the basioccipital.

The single vomer is well developed and separates the palatines in the Chelydidae, rudimentary or absent in the Pelomedusidae, in which the palatines form a median suture. In *Chelys* and *Chelodina*, but not in the other Pleurodira, the præfrontals join the palatines; these genera thus differ by the presence of a bony septum between the orbital and nasal cavities. The pterygoids are extremely broad, join on the median line, and their outer borders expand into thin lateral wings, which in *Podocnemis* extend posteriorly as palatal laminae distinct from the processes which join the quadrates. A more or less developed, rolled up lateral process is present, which borders a deep canal leading into the orbital cavity. As pointed out by Rütimeyer, the presence of this canal is in correlation with the extent to which a postorbital bony septum, formed by the postfrontal, the jugal, and the palatine, is developed; the more complete the separation of the orbital cavity from the temple, the larger the canal; *Chelys* stands, in this respect, at the lower end of the series, the arrangement not being carried out much further than in the most thoroughly aquatic Testudinidae. In none of the Pleurodira do the pterygoids extend posteriorly beyond the quadrates; in *Chelys*, *Emydura*, and *Elseya* they join the maxillary anteriorly, whilst in the other genera they are separated from the latter by the palatine and jugal.

The mandible articulates with the skull by a large single condyle, in which the posterior elements are usually completely fused. A symphyseal suture is present in the Chelydidae, at least in young individuals.

HYOID ARCH.—The hyoid is much developed in the Chelydidae, especially in *Chelys*, *Hydromedusa*, *Chelodina*, and *Hydraspis*. The body is fully ossified, elongate, and hollowed out as a canal for the trachea; in the four above-named genera, there are four ossifications anteriorly, with a membranous space between them and the posterior, elongate, canal-like bone. Two pairs of ossified cornua are present, the anterior the strongest. *Chelys* has a pair of very large bony entoglossals, forming together a Y-shaped figure; entoglossal bones are also present in *Hydromedusa*, but much smaller and sub-circular in shape; they are absent in *Chelodina* and the other genera. In the Pelomedusidae the hyoid is comparatively feebly developed, more as in the Testudinidae. The body is cartilaginous and a single pair of ossified cornua are present, the posterior being cartilaginous.

**PECTORAL ARCH AND FORE LIMB.**—The Pelomedusidæ and Chelydidæ are in this respect very similar to the Testudinidæ, except that the humerus is less strongly curved, and the shape of the coracoid varies within wider limits; thus in *Chelys* the latter bone widens very considerably towards the epicoracoid cartilage, affecting a subtriangular shape very similar so that of the same bone in the Land-Tortoises; in *Podocnemis*, on the contrary, the bone is very narrow and, apart from its being shorter in proportion, resembles that of the Chelonidæ; the other genera are intermediate between the two extremes. The structure of the hand does not differ considerably from that of the freshwater Testudinidæ; there are nine carpal elements, but the radiale and centrale usually fuse, and so do the two outer distal carpals in *Emydura*; in the latter genus and in *Podocnemis* there is a pair of additional small bones, as in many Emyds. The phalanges number 2.3.3.3.3, except in *Pelomedusa*, in which each finger has only two phalanges, the basal and the second being fused into one. The genus *Carettochelys*, as far as can be judged from the figure published, appears to have a manus very similar to that of the Marine Turtles, the penultimate phalanx of the second and third fingers being exceedingly elongate, and the third finger is the longest; only the two inner fingers are provided with claws.

**PELVIS AND HIND LIMB.**—All existing Pleurodira agree in having the pelvis solidly united with the carapace and the plastron. The ilium is expanded at its dorsal extremity, usually subtriangular in horizontal section, and, in the adult, bears no trace of sacral attachment; in the Pelomedusidæ it is anchylosed to the last and penultimate costal plates; in *Chelys*, *Hydromedusa*, and *Rhinemys* to the pygal in addition to the two latter; and in *Chelodina*, *Hydraspis*, *Platemys*, *Emydura*, and *Elseya* to the last costal and the pygal. The pubis is anchylosed to the xiphiplastron on a comparatively small surface, the extremity of the outer branch, the inner or symphyseal branch being perfectly free, slender, more or less dilated towards the symphysis and directed forwards; it is nearly parallel with but widely separated from the ischium. The latter bone is anchylosed to the xiphiplastron by its entire lower surface, which is directed obliquely forwards and forms a symphysis with its fellow. With the exception of *Carettochelys*, the hind limbs closely resemble those of the freshwater Cryptodira. The tarsus contains two bones in the proximal row, a large inner (tibiale + intermedium) and a small outer; the centrale remains distinct in most genera, presenting this peculiarity in *Chelys* that it extends to the inner border of the tarsus, separating the inner element of the distal row from that of the proximal row; the centrale fuses with the tibiale and intermedium in *Chelodina* and *Elseya*, and with the tibiale, the intermedium, and the fibulare in one specimen of *Emydura macquariæ*. Reckoning as tarsal the outer bone which is frequently termed the fifth metatarsal, we have five tarsal bones in the distal row, and the phalanges number 2.3.3.3.3, except in *Rhinemys*, which has only two in the fifth toe, and *Pelomedusa*, where, through fusion, they are reduced to 2.2.2.3.2 or 2.2.3.3.2.



Fam. 8. **PELOMEDUSIDÆ.**

Emydidæ, part., *Gray, Ann. Phil.* (2) x. 1825.

Emydidæ, part., *Bell, Zool. Journ.* iii. 1828.

Steganopodes, part., *Wagler, Syst. Amph.* 1830.

Chelydæ, part., *Gray, Syn. Rept.* 1831.

Elodites Pleurodères, part., *Duméril & Bibron, Exp. Gén.* ii. 1835.

Chelydidæ, part., *Gray, Cat. Tort.* 1844, and *Sh. Rept.* i. 1855.

Hydraspididæ, part., *Agassiz, Contr. N. H. U. S.* i. 1857.

Chelyda, part., *Strauch, Chelon. Stud.* 1862.

Pelomedusidæ, Sternotheridæ, Podocnemididæ, *Cope, Proc. Ac. Philad.* 1868, pp. 119, 282.

Pelomedusidæ, Peltoccephalidæ, *Gray, Suppl. Cat. Sh. Rept.* i. 1870.

Pelomedusidæ, *Boulenger, Ann. & Mag. N. H.* (6) i. p. 347 (1888).

Sternotheridæ, Pelomedusidæ, *Baur, Zool. Anz.* 1888, p. 420.

Plastral bones eleven, mesoplastra being present. Shell covered with epidermal shields. Neck completely retractile within the shell; second cervical vertebra biconvex. A bony temporal arch; no parieto-squamosal arch; palatine bones in contact; no nasals; præfrontals in contact; dentary single. Digits moderately elongate; claws four or five.

Africa, Madagascar, South America.

*Synopsis of the Genera.*

No bony temporal roof; mesoplastra extending right across the plastron; front lobe of plastron movable in the adult; both pairs of limbs with five claws..... 1. **Sternotherus**, p. 191.

No bony temporal roof; mesoplastra small and lateral; both pairs of limbs with five claws..... 2. **Pelomedusa**, p. 197.

A bony temporal roof, the quadratojugal forming a suture with the parietal; mesoplastra small and lateral. 3. **Podocnemis**, p. 200.

**1. STERNOTHERUS.**

Sternotherus, part., *Bell, Zool. Journ.* ii. p. 305 (1825).

Pelusios, *Wagler, Syst. Amph.* p. 137 (1830).

Sternotherus, *Gray, Syn. Rept.* p. 37 (1831); *Dum. & Bibr.* ii. p. 396 (1835); *Gray, Cat. Tort.* p. 37 (1844), and *Sh. Rept.* i.

p. 51 (1855); *Strauch, Chelon. Stud.* p. 43 (1862); *Gray, Proc. Zool. Soc.* 1863, p. 192, and *Suppl. Cat. Sh. Rept.* i. p. 78 (1870).

Tanoa, *Gray, Proc. Zool. Soc.* 1863, p. 193.

Notoa, *Gray, l. c.* p. 195.

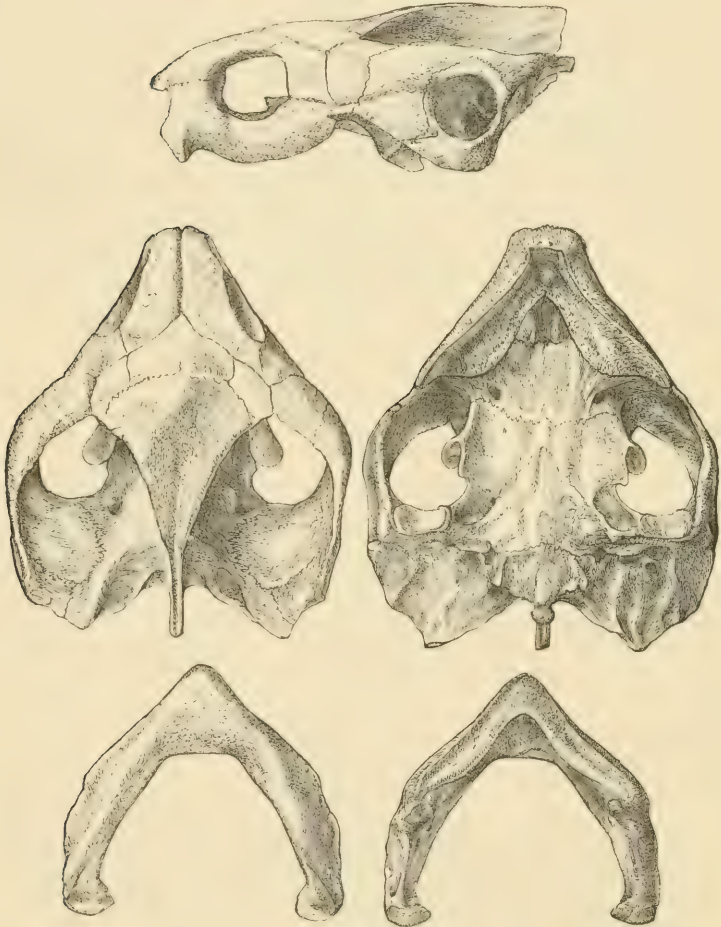
Anota (*non* Hallow.), *Gray, l. c.* p. 196.

Mesoplastral bones extending right across the plastron; plastron large, front lobe movable in the adult, a hinge being present between the hyoplastra and the mesoplastra. Skull without supratemporal roof, the quadratojugal widely separated from the parietal;

alveolar surface of upper jaw with a very indistinct median ridge; a pair of shields, separated by a longitudinal suture, between the eyes, followed by a large parietal. Digits very short, the median with three phalanges; five claws to each foot.

Tropical and South Africa; Madagascar.

Fig. 46.



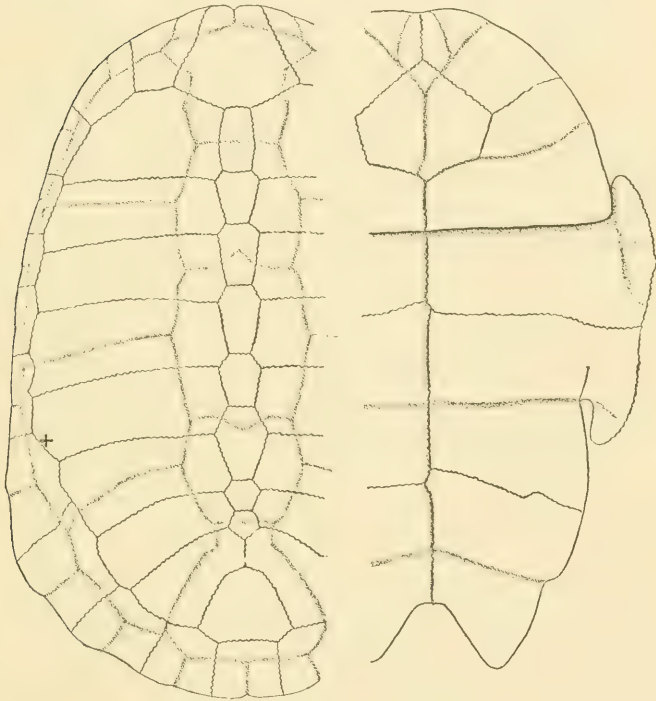
Skull of *Sternotherus niger*. (From Gray, P. Z. S. 1873.)

*Synopsis of the Species.*

- I. Suture between the abdominal shields longer than that between the humerals; front lobe of plastron strongly hinged.

- A. Beak strongly hooked; interorbital width considerably less than the longitudinal suture between the two frontal shields ..... 1. *niger*, p. 194.
- B. Beak notched mesially, with a very slight, obtuse cusp on each side of the notch; interorbital width considerably less than the longitudinal suture between the frontal shields . 2. *sinuatus*, p. 194.

Fig. 47.

Shell of *Sternotherus derbianus*.

- C. Beak neither hooked nor bicuspid; frontal suture not or but slightly exceeding the width of the interorbital space.
- The length of the outer border of the pectoral shield equals that of the humeral . 3. *nigricans*, p. 195.
- The length of the outer border of the pectoral is much less than that of the humeral, and does not exceed the length of the inner border of the latter shield. . 4. *derbianus*, p. 195.

II. Suture between the abdominal shields shorter than that between the humerals; plastral hinge feeble.

The length of the outer border of the pectoral shield equals that of the humeral . . . 5. *adansonii*, p. 196.

The length of the outer border of the pectoral is less than that of the humeral . . . 6. *gabonensis*, p. 197.

### 1. *Sternothærus niger*.

*Sternothærus niger*, *Dum. & Bibr.* ii. p. 397, pl. xx. fig. 1 (1835); *Gray, Cat. Tort.* p. 37 (1844), and *Sh. Rept.* i. p. 51 (1855), and *Suppl.* p. 81 (1870); *Peters, Mon. Berl. Ac.* 1875, p. 196.

*Sternothærus*, sp., *Gray, Proc. Zool. Soc.* 1873, p. 393, fig.

Carapace with a feeble, interrupted keel. Plastral shields apparently as in *S. derbianus*. Upper jaw strongly hooked, not notched; the width of the interorbital space is less than the longitudinal suture between the two shields on the snout. Shell black; head fulvous above, marbled with brown; jaws yellowish, with vertical brown lines.

West Africa (Cameroons).

a. Ad., skull.

W. Africa.

M. Du Chaillu [C.].

### 2. *Sternothærus sinuatus*.

*Sternothærus sinuatus*, *Smith, Ill. Zool. S. Afr., Rept.* pl. i. (1838); *A. Dum. Cat. Méth. Rept.* p. 19 (1851); *Gray, Proc. Zool. Soc.* 1863, p. 193, and *Suppl. Cat. Sh. Rept.* i. p. 78 (1870); *Peters, Reise n. Mossamb.* iii. p. 8 (1882).

— *dentatus*, *Peters, Arch. f. Anat. u. Phys.* 1848, p. 494.

— *castaneus*, *Gray, Cat. Tort.* p. 37 (1844), and *Sh. Rept.* i. p. 52 (1855).

Carapace rather elongate, posterior margin more or less serrated or sinuated, except in old specimens; second and third vertebral shields about as long as broad in the adult. Intergular shield more than twice as long as broad; suture between the abdominal shields longer than that between the femorals; the length of the outer border of the pectoral shield is as great or a little less than that of the humeral, and exceeds the length of the inner border of the latter shield. Head moderate; snout short; upper jaw notched in the middle, with a very slight, rather indistinct obtuse cusp on each side of the notch; interorbital width less than the longitudinal suture between the two shields on the snout. Carapace dark brown or blackish; plastron yellow or blackish; head pale brown above, with darker vermiculations.

Length of shell 22 centim.

South Africa; East Africa south of the Equator; Seychelles.

|                          |                            |                      |
|--------------------------|----------------------------|----------------------|
| <i>a, b.</i> ♂ ♀, stffd. | Natal.                     |                      |
| <i>c.</i> ♀, stffd.      | S. Africa.                 |                      |
| <i>d.</i> Yg., spir.     | E. Africa.                 | Sir J. Kirk [C]      |
| <i>e.</i> ♀, spir.       | La Digne Isd., Seychelles. | Dr. A. Günther [P.]. |

### 3. *Sternothærus nigricans.*

- Testudo nigricans*, *Donndorff, Zool. Beitr.* iii. p. 34 (1798).  
 — *subnigra*, *Daud. Rept.* ii. p. 197 (1802).  
*Emys castanea*, *Schweigg. Prodr.* p. 45 (1814).  
 — *subnigra*, *Schweigg. l. c.* p. 46.  
*Terrapene nigricans*, *Merr. Tent.* p. 28 (1820).  
*Kinosternon nigricans*, *Bell, Zool. Journ.* ii. p. 305 (1825).  
*Sternothærus leachianus*, *Bell, l. c.* p. 306, pl. xv. (1825).  
 — *castaneus*, *Gray, Syn. Rept.* p. 38 (1831); *Dum. & Bibr.* ii. p. 401 (1835).  
 — *subniger*, *Gray, l. c., and Cat. Tort.* p. 37 (1844), and *Sh. Rept.* i. p. 51 (1855), and *Suppl.* p. 79 (1870).  
 — *nigricans*, *Dum. & Bibr.* p. 399; *Bianconi, Spec. Zool. Mosamb.* p. 58, pl. vii. (1851); *Strauch, Chelon. Stud.* p. 148 (1862); *Peters, Reise n. Mossamb.* iii. p. 8 (1882).

Carapace obtusely keeled in the young, posterior margin entire; second and third vertebral shields a little broader than long in the adult. Intergular shield large, not twice as long as broad; suture between the abdominal shields longer than that between the femorals; the length of the outer border of the pectoral shield equals that of the humeral, and exceeds the length of the inner border of the latter shield. Head large; snout very short; upper jaw neither hooked nor bicuspid; the length of the longitudinal suture between the frontal shields nearly equals the width of the interorbital space. Dark brown above, yellow, or yellow and brown, inferiorly; upper surface of head without spots or vermiculation.

Length of shell 15 centim.

Madagascar; Mozambique.

|                       |             |                      |
|-----------------------|-------------|----------------------|
| <i>a-c.</i> ♀, spir.  | Madagascar. | Dr. A. Günther [P.]. |
| <i>d.</i> ♀, stffd.   | Madagascar. |                      |
| <i>e.</i> ♀, skel.    | Madagascar. |                      |
| <i>f.</i> ♀, stffd.   | —?          |                      |
| <i>g.</i> Hgr., spir. | —?          |                      |

### 4. *Sternothærus derbianus.*

- Sternothærus derbianus*, *Gray, Cat. Tort.* p. 37 (1844), and *Sh. Rept.* i. p. 52, pl. xxii. (1855); *Strauch, Verh. Schildkr.* p. 109 (1865); *Bocage, Jorn. Sc. Lisb.* i. p. 57 (1866); *Gray, Suppl. Cat. Sh. Rept.* i. p. 79 (1870); *Bœttg. Abh. Senck. Ges.* xii. p. 409 (1881), and *Ber. Senck. Ges.* 1888, p. 15.

Carapace keeled in the young, the keel disappearing in the adult, the shields of which are smooth; second and third vertebral shields a little longer than broad in the adult. Intergular shield not more than twice as long as broad; suture between the abdominal shields



longer than that between the femorals; the length of the outer border of the pectoral shield is much less than that of the humeral, and does not exceed the length of the inner border of the latter shield. Head large; snout very short; upper jaw neither hooked nor bicuspid; the width of the interorbital space at least equals the longitudinal suture between the two frontal shields. Dark brown or blackish, plastral shields usually yellowish in the middle; head brownish above, closely vermiculated with black; upper lip with blackish dots or vertical lines.

Length of shell 27 centim.

West Africa.

|                                 |               |                             |
|---------------------------------|---------------|-----------------------------|
| <i>a.</i> ♀, stffd.             | Gambia..      | Earl of Derby [P.]. (Type.) |
| <i>b.</i> ♀, shell.             | Sierra Leone. |                             |
| <i>c, d.</i> Hgr. & yg., stffd. | Cape Verde.   | M. Boucard [C.].            |
| <i>e.</i> Hgr., spir.           | Angola.       | J. J. Monteiro, Esq. [P.].  |
| <i>f, g, h.</i> ♂ ♀, stffd.     | W. Africa.    |                             |
| <i>i, k.</i> ♂ ♀, shells.       | W. Africa.    |                             |
| <i>l.</i> Yg., spir.            | W. Africa.    |                             |
| <i>m.</i> Yg., spir.            | —?            |                             |

### 5. *Sternothærus adansonii*.

*Emys adansonii*, *Schweigg. Prodr.* p. 39 (1814).

*Hydraspis adansonii*, *Gray, Syn. Rept.* p. 40 (1831).

*Pentonyx adansonii*, *Dum. & Bibr.* ii. p. 394 (1835).

*Pelomedusa* ? *adansonii*, *Gray, Cat. Tort.* p. 38 (1844).

*Sternothærus adansonii*, *A. Dum. Cat. Méth. Rept.* p. 19 (1851);  
*Gray, Cat. Sh. Rept.* i. p. 52 (1855), and *Proc. Zool. Soc.* 1864,  
p. 296, pl. xxiii., and *Suppl. Cat. Sh. Rept.* i. p. 80 (1870).

Carapace keeled throughout life; second and third vertebral shields nearly as long as broad in the adult. Hind lobe of plastron narrower than in the preceding species. Intergular shield not twice as long as broad; suture between the abdominal shields shorter than that between the femorals; the length of the outer border of the pectoral shield equals or slightly exceeds that of the humeral. Head large; snout very short; upper jaw neither hooked nor bicuspid; the width of the interorbital space equals the longitudinal suture between the two frontal shields. Shell yellowish or pale brown above, with dark brown dots and radiating lines; uniform yellow inferiorly; head brown above, elegantly vermiculated with yellow; lips and lower parts uniform yellowish.

Length of shell 15 centim.

Senegambia and Sudan.

|                                      |             |                        |
|--------------------------------------|-------------|------------------------|
| <i>a, b, c.</i> ♂, ♀, & hgr., stffd. | W. Africa.  |                        |
| <i>d-e, f.</i> Hgr., spir.           | W. Africa.  |                        |
| <i>g.</i> Hgr., shell.               | W. Africa.  |                        |
| <i>h.</i> Hgr., spir.                | Upper Nile. | Consul Petherick [C.]. |

6. *Sternothærus gabonensis*.

*Pentonyx gabonensis*, *A. Dum. Arch. Mus.* x. p. 164, pl. xiii. fig. 2 (1860); *Gray, Ann. & Mag. N. H.* (3) xiii. p. 168 (1864).

*Pelomedusa gabonensis*, *Strauch, Chelon. Stud.* p. 45 (1862), and *Verth. Schildkr.* p. 107 (1865).

*Sternothærus gabonensis*, *Bocage, Jorn. Sc. Lisb.* i. p. 57 (1866).

This species is founded upon a quite young specimen which, judging from the figure, agrees with *S. derbianus* in the comparative size of the humeral and pectoral shields, with *S. adansonii* in the shortness of the abdominal shields. Carapace and plastron blackish brown.

Gaboon, Angola.

## 2. PELOMEDUSA.

*Pelomedusa*, *Wagl. Syst. Amph.* p. 136 (1830); *Gray, Cat. Tort.* p. 37 (1844), and *Sh. Rept.* i. p. 52 (1855); *Strauch, Chelon. Stud.* p. 44 (1862); *Gray, Suppl. Cat. Sh. Rept.* i. p. 81 (1870).

*Hydraspis*, part., *Gray, Syn. Rept.* p. 39 (1831).

*Pentonyx*, *Dum. & Bibr.* ii. p. 389 (1835).

Mesoplastral bones small, lateral, wedged in between the hyo- and the hypoplastra; plastron narrow, without hinge. Skull without supratemporal roof, the quadrato-jugal widely separated from the parietal; alveolar surface of the upper jaw with a very indistinct median ridge; a pair of shields, separated by a longitudinal suture, between the eyes, followed by a large interparietal. Digits very short, mostly with only two phalanges; five claws to each foot.

Africa and Madagascar.

1. *Pelomedusa galeata*.

*Testudo galeata*, *Schoepff, Test.* p. 12, pl. iii. fig. 1 (1792); *Daua, Rept.* ii. p. 136 (1802).

— *badia*, *Donnd. Zool. Beitr.* iii. p. 34 (1798).

— *subrufa*, *Daud. l. c.* p. 132.

*Emys olivacea*, *Schweigg. Prodr.* p. 38 (1814).

— *galeata*, *Schweigg. l. c.*

— *subrufa*, *Schweigg. l. c.* p. 39.

*Pelomedusa galeata*, *Wagl. Syst. Amph.* pl. ii. figs. xxxvi.-xliii. (1830); *Strauch, Chelon. Stud.* p. 150 (1862), and *Verth. Schildkr.* p. 111 (1865); *Bouleng. Bull. Soc. Zool. France*, 1880, p. 146; *Boettg. Abh. Senck. Ges.* xii. p. 410 (1881); *Peters, Reise n. Mossamb.* iii. p. 6 (1882); *Bocage, Jorn. Sc. Lisb.* x. p. 202 (1887); *Boettg. Ber. Senck. Ges.* 1888, p. 13.

*Hydraspis subrufa*, *Gray, Syn. Rept.* p. 39 (1831).

*Pentonyx capensis*, *Dum. & Bibr.* ii. p. 390, pl. xix. fig. 2 (1835); *A. Dum. Arch. Mus.* x. pl. xiii. fig. 3 (1860).

— *gehafe*, *Rüppell, N. Wirbelth. Faun. Abyss.* p. 2, pl. i. (1835); *A. Dum. Cat. Méth. Rept.* p. 18 (1851), and *Arch. Mus.* vi. p. 245 (1852), & x. pl. xiii. fig. 4.

*Pelomedusa gehafise*, Gray, *Cat. Tort.* p. 38 (1844), and *Sh. Rept.* i. p. 53 (1855), and *Suppl.* p. 81 (1870); *Sclater*, *Proc. Zool. Soc.* 1871, p. 325, fig.

— *subrufa*, Gray, *ll. cc.*, and *App.* p. 24 (1872).

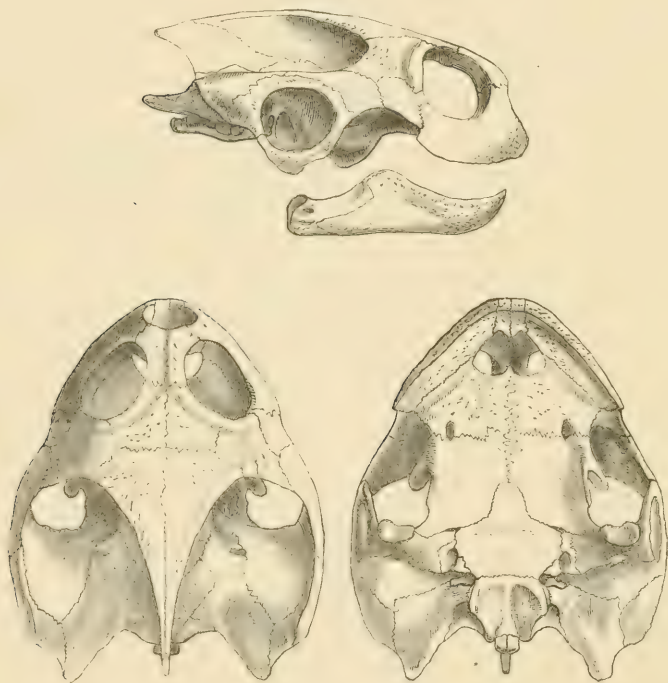
*Pentonyx americana*, *Cornalia*, *Vert. Syn. Mus. Mediol.* p. 13 (1849).

*Pelomedusa mozambica* (*Peters*), Gray, *Cat. Sh. Rept.* p. 53.

— *nigra*, Gray, *Ann. & Mag. N. H.* (3) xii. p. 99 (1863), and *Suppl. Cat. Sh. Rept.* p. 81.

*Hydraspis galeata* (*Bell*), *Sowerby & Lear*, *Tort.* pls. xlix. & l. (1872).

Fig. 48.



Skull of *Pelomedusa galeata*.

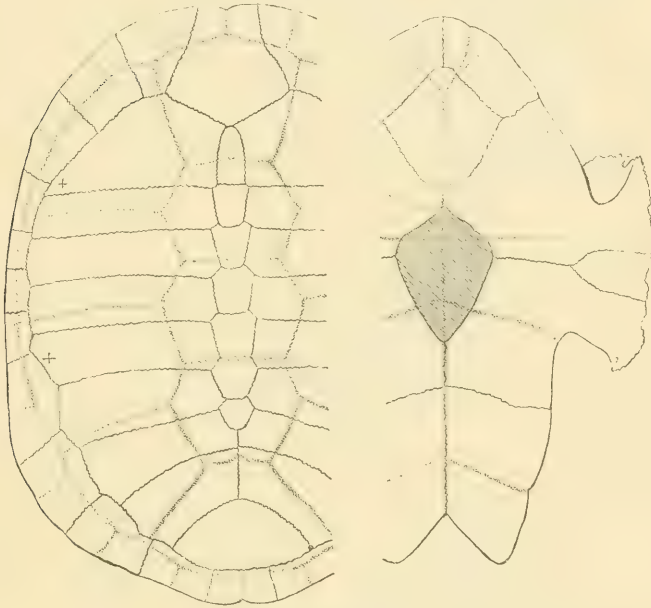
Carapace much depressed, obtusely keeled; first vertebral shield largest, a little broader than long. Plastron much smaller than the opening of the shell; front lobe truncate, broader than the hind lobe, which is angularly notched; the width of the bridge contained thrice and a half to four times in the length of the plastron; intergular shield much longer than gulars; pectoral and abdominal shields nearly equally developed on the bridge; pectorals either forming a median suture, very variable in length, or separated from each other. Head short, broad; five large shields on the upper surface, viz. a pair of frontal-supraorbitals, a pair of parietals, and a

very large interparietal; chin with a pair of small warts. Upper parts brown, uniform or dotted with black; lower parts brown or yellow.

Length of shell 26 centim.

Tropical and South Africa; Madagascar; Sinaitic Peninsula.

Fig. 49.



Shell of *Pelomedusa galeata*.

|                                                 |                          |                                                  |
|-------------------------------------------------|--------------------------|--------------------------------------------------|
| <i>a.</i> Yg., spir.                            | Mount Sinai.             |                                                  |
| <i>b, c.</i> ♂ & yg., stffd.                    | Abyssinia.               | Dr. Rüppell. (As typical of <i>P. gehafie</i> .) |
| <i>d.</i> Yg., spir.                            | Abyssinia.               | W. T. Blanford, Esq. [P.]                        |
| <i>e.</i> Hgr., shell.                          | E. Africa.               | Capt. Speke [C.]                                 |
| <i>f.</i> Yg., shell.                           | Victoria Nyanza.         | — Baines [C.]                                    |
| <i>g.</i> Yg., spir.                            | Monbuttu, C. Africa.     | Dr. Emin Pasha [P.]                              |
| <i>h.</i> Yg., spir.                            | W. Africa.               |                                                  |
| <i>i.</i> Hgr., spir.                           | S. Africa.               |                                                  |
| <i>k, l, m.</i> ♂ & hgr.                        | Natal.                   | (Types of <i>P. nigra</i> .)                     |
| <i>n.</i> Yg., stffd.                           | Natal.                   | Sir A. Smith [P.]                                |
| <i>o.</i> ♀, stffd.                             | Cape of Good Hope.       | Dr. J. E. Gray [P.]                              |
| <i>p, q, r.</i> ♂ & yg., stffd.                 | Cape of Good Hope.       | J. S. Bowerbank, Esq. [P.]                       |
| <i>s, t, u, v, w, x.</i> ♂, hgr., & yg., skins. | Ekongo, S.W. Madagascar. | Mr. J. Waters [C.]                               |
| <i>y.</i> ♂, spir.                              | [Bahia.]                 | Dr. Wucherer.                                    |
| <i>z, a, β.</i> Hgr. & yg., skels.              | — ?                      |                                                  |

## 3. PODOCNEMIS\*.

*Podocnemis*, Wagler, *Syst. Amph.* p. 135 (1830); *Dum. & Bibr.* ii. p. 382 (1835); *Gray, Cat. Tort.* p. 45 (1844), and *Sh. Rept.* i. p. 61 (1855); *Strauch, Chelon. Stud.* p. 42 (1862); *Gray, Suppl. Cat. Sh. Rept.* i. p. 83 (1870), and *App.* p. 26 (1872).

*Hydraspis*, part., *Gray, Syn. Rept.* p. 39 (1831).

*Peltocephalus*, *Dum. & Bibr.* ii. p. 577; *Gray, Cat. Tort.* p. 44, and *Sh. Rept.* p. 61; *Strauch, l. c.* p. 41; *Gray, Suppl.* p. 84.

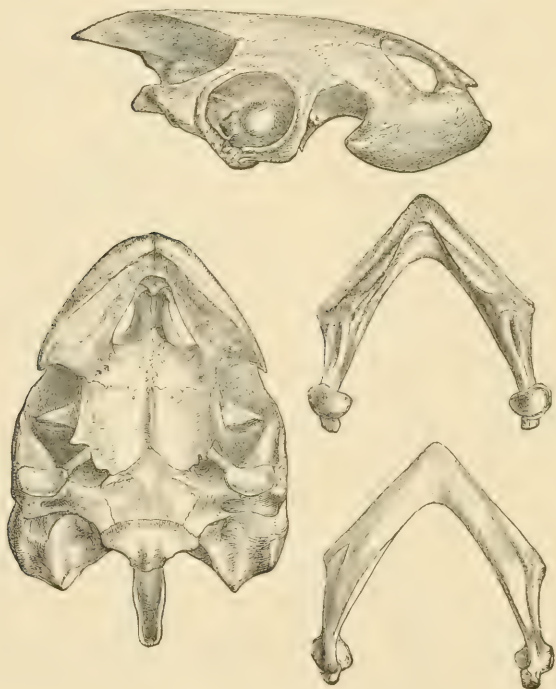
*Chelonemys*, *Gray, Proc. Zool. Soc.* 1864, p. 134, and *Suppl.* p. 83, and *App.* p. 25.

*Dumerilia* (non *Bocage*), *Grandid. Rev. et Mag. de Zool.* (2) xix. p. 232 (1867); *Gray, Suppl.* p. 82, and *Ann. & Mag. N. H.* (4) xi. p. 149 (1873).

*Bartlettia*, *Gray, Proc. Zool. Soc.* 1870, p. 720, and *App.* p. 26.

*Erymnochelys*, *Baur, Zool. Anz.* 1888, p. 421.

Fig. 50.

Skull of *Podocnemis sextuberculata*. (From Gray, P. Z. S. 1870.)

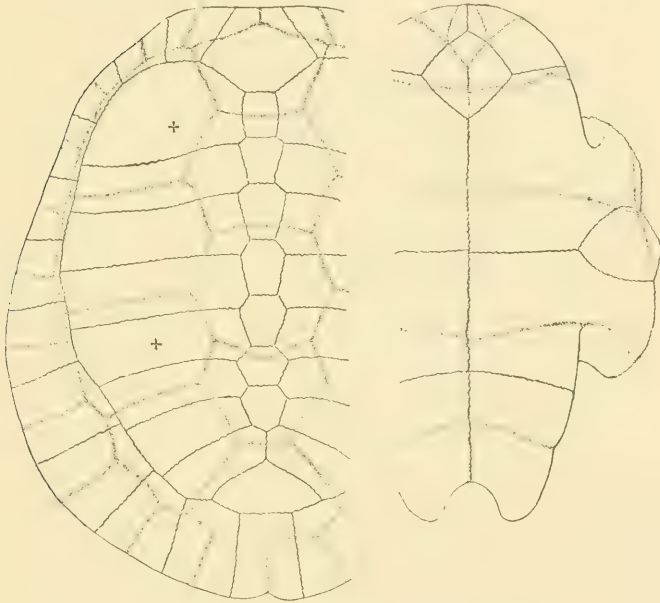
\* *Podocnemis coutinhii*, Göldi, Ber. S. Gall. Nat. Ges. 1884-5, p. 279, pl. v. (1886), from the Amazon, rests on a very imperfect description and figure taken from a quite young specimen.



Mesoplastral bones small, lateral, wedged in between the hyo- and the hypoplastra; plastron large, without hinge, with strong axillary and inguinal buttresses. A bony temporal roof, the quadratojugal forming a suture with the parietal; alveolar surface of upper jaw with one or more ridges; a single shield between the eyes; a pair of large parietal shields and an interparietal. Digits broadly webbed, fore foot with five claws, hind foot with four. Tail very short.

South America and Madagascar.

Fig. 51.



Shell of *Podocnemis sextuberculata*.

*Synopsis of the Species.*

I. Forehead concave; jugal and quadrate bones separated.

A. Alveolar ridges of upper jaw strong, running along the whole length of the jaw.

- |                                                                        |                                 |
|------------------------------------------------------------------------|---------------------------------|
| Mental barbels two; a single inter-<br>parietal shield .....           | 1. <i>dumeriliana</i> , p. 202. |
| Mental barbels two; two azygous shields<br>between the parietals ..... | 2. <i>lewynana</i> , p. 203.    |
| A single barbel .....                                                  | 3. <i>unifilis</i> , p. 203.    |

B. Alveolar ridges short and feeble.

- Mental barbels two ..... 4. *expansa*, p. 204.  
 A single barbel ..... 5. *sextuberculata*, p. 204.

II. Forehead flat; jugal in contact with the quadrate.

- Intergular shield very small, shorter  
 than the gulars; interparietal shield  
 pointed behind ..... 6. *madagascariensis*, p. 205.  
 Intergular shield longer than the  
 gulars; interparietal shield widening  
 behind ..... 7. *tracava*, p. 206.

### 1. *Podocnemis dumeriliana*.

*Emys dumeriliana*, *Schweigg. Prodr.* p. 31 (1814).

— *cayennensis*, *Schweigg. l. c.* p. 29.

— *erythrocephala*, *Spix, Test. Bras.* p. 9, pl. vii. (1824).

*Hydraspis dumeriliana*, *Gray, Syn. Rept.* p. 42 (1831).

— *cayennensis*, *Gray, l. c.*

— *lata*, *Gray, l. c.* p. 77.

*Podocnemis dumeriliana*, *Dum. & Bibr. ii.* p. 387 (1835); *Gray, Cat. Tort.* p. 45 (1844); *Strauch, Chelon. Stud.* p. 147 (1862); *Gray, Proc. Zool. Soc.* 1864, p. 134.

— *dumeriliana*, part., *Gray, Cat. Sh. Rept. i.* p. 62, pl. xxviii. (1855).

*Chelonemys dumeriliana*, part., *Gray, Suppl. Cat. Sh. Rept. i.* p. 83 (1870), and *App. p.* 25 (1872).

Carapace oval, rather convex, but feebly expanded posteriorly; usually second and third vertebral shields with an obtuse keel. Plastron large, front lobe broader than hind lobe; the width of the bridge at least equals the width of the hind lobe; intergular shield much longer than the gulars; the longest median suture is formed by the abdominals, the shortest by the humerals. Interorbital space concave, much narrower than the diameter of the orbit; upper jaw not hooked; a large interparietal shield, behind which the parietals usually form a suture; this shield subcordiform and as broad as long in the young, much elongate in the adult; the width of the mandible at the symphysis exceeds the diameter of the orbit; alveolar surface of upper jaw with two strong ridges, running along the whole length of the jaw; lower jaw with three cutting-edges, the median and the inner close together. Chin with two short dermal appendages. Two very large shields on the outer border of the foot. Carapace brown or blackish above; lower surface yellowish or brownish, with blotches of blackish; head reddish brown in the adult, in the young blackish, with a yellowish band on each jaw, a yellowish spot behind the eye, and a pair of yellowish round spots with black centre on the interparietal shield.

Length of shell 38 centim.

System of the Amazon.

|                           |                        |                         |
|---------------------------|------------------------|-------------------------|
| <i>a.</i> ♂, stffd.       | Santa Cruz.            | Mr. E. Bartlett [C.].   |
| <i>b, c.</i> Ad., skulls. | Upper Amazon.          | Mr. E. Bartlett [C.].   |
| <i>d, e.</i> Ad., skulls. | Ega.                   | H. W. Bates, Esq. [C.]. |
| <i>f.</i> ♀, stffd.       | Lakes of Upper Amazon. | H. W. Bates, Esq. [C.]. |
| <i>g.</i> Ad., shell.     | Lakes of Upper Amazon. | H. W. Bates, Esq. [C.]. |
| <i>h.</i> Yg., stffd.     | Lower Amazon.          |                         |
| <i>i.</i> Yg., stffd.     | Brazil.                |                         |

## 2. *Podocnemis lewyana*.

*Podocnemis lewyana*, *A. Dum. Arch. Mus.* vi. p. 242, pls. xviii. & xix. (1852).

Apparently closely allied to the preceding. Carapace more depressed, without keel. Front lobe of plastron not broader than hind lobe. Snout longer; interparietal shield broader than long, followed by a small triangular shield. Three large scales on the outer side of the foot, upper largest. Shell olive, more or less vermiculate or spotted with black.

Length of shell 26 centim.

Colombia (Bogota) and Venezuela.

## 3. *Podocnemis unifilis*.

*Podocnemis unifilis*, *Trosch. in Schomb. Reise Brit. Guian.* iii. p. 647 (1848); *Sclater, Proc. Zool. Soc.* 1871, p. 745.

— *dumeriliana*, part., *Gray, Cat. Sh. Rept.* i. p. 62 (1855).

*Chelonemys dumeriliana*, part., *Gray, Suppl. Cat. Sh. Rept.* i. p. 83 (1870), and *Ann. & Mag. N. H.* (4) viii. p. 68 (1871), and *App.* p. 25 (1872).

Agrees with *P. dumeriliana* in the shape of the shell and head and the presence of a single interparietal shield; with *P. lewyana* in the presence of three large shields on the outer side of the foot; differs from both in the presence of a single dermal appendage on the chin. Carapace brown, uniform or spotted with black, with the edge yellowish or reddish; plastron brown and yellowish. Head dark brown, with yellow spots disposed as follows:—One on the snout, one on each side of the nasal region, one from below the eye to the mandible, one behind the eye, one above the ear, and a pair on the interparietal shield.

The species reaches a length of 31 centim., according to Schomburgk; the shell of the largest specimen in the Museum measures  $11\frac{1}{2}$  centim.

Guianas and Northern Brazil.

|                         |               |                       |
|-------------------------|---------------|-----------------------|
| <i>a.</i> Hgr., spir.   | Upper Amazon. | Mr. E. Bartlett [C.]. |
| <i>b.</i> Hgr., stffd.  | Upper Amazon. |                       |
| <i>c.</i> Yg., spir.    | Para.         |                       |
| <i>d, e.</i> Yg., spir. | — ?           |                       |

4. *Podocnemis expansa*.

*Emys expansa*, *Schweigg. Prodr.* p. 30 (1814).

— *amazonica*, *Spix, Test. Bras.* p. 1, pls. i. & ii. figs. 1-3 (1824).

*Hydraspis expansa*, *Gray, Syn. Rept.* p. 41 (1831).

*Podocnemis expansa*, *Wagl. Syst. Amph.* pl. iv. figs. i.-xxxi. (1830);  
*Dum. & Bibr.* ii. p. 383 (1835); *Gray, Cat. Tort.* p. 45 (1844);  
*Strauch, Chelon. Stud.* p. 146 (1862), and *Verth. Schildkr.* p. 102  
 (1865).

— *expansa*, part., *Gray, Cat. Sh. Rept.* i. p. 61, pl. xxxvii. fig. 1  
 (1855), and *Proc. Zool. Soc.* 1864, p. 133, and *Suppl.* p. 83 (1870).

Carapace much depressed in the adult, tectiform in the young, expanded posteriorly. Plastron large, front lobe as broad as or broader than hind lobe; the width of the bridge equals or slightly exceeds the width of the hind lobe; intergular shield much longer than gular; the longest median suture is usually formed by the abdominals, the shortest by the humerals. Interorbital space concave, much narrower than the diameter of the orbit; upper jaw not hooked; a large interparietal shield, behind which the parietals form a short suture, if any; the width of the mandible at the symphysis exceeds the diameter of the orbit; alveolar surface of upper jaw with three short ridges, median strongest; lower jaw with three cutting-edges, the median shortest. Chin with two short dermal appendages. Two very large shields on the outer border of the foot. Brown or olive above, spotted with darker; plastron yellowish, spotted with brown. Young olive above, yellow inferiorly; supraciliary borders yellow; a yellow spot behind the eye and a pair on the interparietal shield.

Length of shell 77 centim.

Tropical South America east of the Andes.

|                                  |                  |                       |
|----------------------------------|------------------|-----------------------|
| <i>a.</i> Ad., skel.             | Peruvian Amazon. | Mr. E. Bartlett [C.]. |
| <i>b.</i> <i>c.</i> Ad., skulls. | Peruvian Amazon. | Mr. E. Bartlett [C.]. |
| <i>d.</i> Ad., skull.            | Upper Amazon.    |                       |
| <i>e-g.</i> Yg., spir.           | Rio Ucayali.     | W. Davis, Esq. [C.].  |
|                                  |                  | Messrs. Veitch [P.].  |
| <i>h-n.</i> Yg., spir.           | Manãos, Brazil.  | M. A. Peixoto [C.].   |
| <i>o.</i> Yg., spir.             | Bahia.           | Dr. Wucherer [C.].    |
| <i>p.</i> Yg., stffed.           | Brazil.          |                       |
| <i>q, r.</i> Yg., spir.          | — ?              |                       |

5. *Podocnemis sextuberculata*.

*Podocnemis sextuberculata*, *Cornalia, Vert. Syn. Mus. Mediolan.* p. 13, pl. iii. (1849).

— *expansa*, part., *Gray, Cat. Sh. Rept.* i. p. 61, pl. xxvii. (1855), and *Suppl.* p. 83 (1870).

*Bartlettia pitipii*, *Gray, Proc. Zool. Soc.* 1870, p. 720; *Sclater, Proc. Zool. Soc.* 1878, p. 741, fig.; *Gray, App. Cat. Sh. Rept.* p. 27 (1872).

Carapace much depressed, obtusely keeled, expanded posteriorly. Plastron large, front lobe broader than hind lobe; the width of the

bridge less than the width of the hind lobe; intergular shield much longer than gulars; the longest median suture is formed by the abdominals, the shortest by the humerals; young with three tubercular swellings on each side of the plastron, traces of which may be found in adult specimens. Interorbital space concave, much narrower than the diameter of the orbit; upper jaw not hooked; a large interparietal shield, entirely separating the parietals; the width of the mandible at the symphysis nearly equals the diameter of the orbit; alveolar surface of upper jaw with a short and feeble ridge; inner edge of mandible much raised, the mandible subtriangular in section. Chin with a single dermal appendage. Two very large shields on the outer border of the foot. Shell brown or olive above, yellowish, blotched with brown, inferiorly; head reddish brown above.

Length of shell 31 centim.

Amazon.

|                |               |                         |                                                       |
|----------------|---------------|-------------------------|-------------------------------------------------------|
| a. Ad., spir.  | Upper Amazon. | Mr. E. Bartlett [C.].   | } (Types of<br><i>Bartlettia</i><br><i>pitipii</i> .) |
| b. Ad., stfid. | Upper Amazon. | Mr. E. Bartlett [C.].   |                                                       |
| c. Ad., skel.  | Upper Amazon. | Mr. E. Bartlett [C.].   |                                                       |
| d. Ad., shell. | Upper Amazon. | H. W. Bates, Esq. [C.]. |                                                       |

### 6. *Podocnemis madagascariensis*.

*Dumerilia madagascariensis*, *Grandid. Rev. et Mag. de Zool.* (2) xix. p. 232 (1867); *Gray, Suppl. Cat. Sh. Rept.* i. p. 82 (1870), and *Ann. & Mag. N. H.* (4) xi. p. 149 (1873).

Shell oval, moderately depressed, keeled in the young; posterior border more or less strongly reverted; dorsal shields with more or less distinct radiating striae. Plastron large, front lobe broader than hind lobe; the width of the bridge equals the width of the hind lobe; intergular shield very small, much shorter than the gulars, which form a suture behind. Interorbital space flat, nearly as broad as the diameter of the orbit in the adult, half as broad in the young; upper jaw slightly hooked; jugal bone forming a suture with the quadrate; a large interparietal shield, behind which the parietals form a suture; the width of the mandible at the symphysis much exceeds the diameter of the orbit; alveolar surface of both jaws with a feeble median ridge. Chin with a short dermal appendage. Three very large shields on the outer border of the foot. Brown above, finely dotted or striated with black; plastron yellow, uniform or soiled with brown.

Length of shell 35 centim.

Madagascar.

|                                |                            |                     |
|--------------------------------|----------------------------|---------------------|
| a. Ad., skel.                  | Anuavandra, W. Madagascar. |                     |
| b. ♀, stfid.                   | S.E. Betsileo.             | Mr. T. Waters [C.]. |
| c, d, e, f. Hgr. & yg., skins. | S.E. Betsileo.             | Mr. T. Waters [C.]. |
| g. ♂, skel.                    | S.E. Betsileo.             | Mr. T. Waters [C.]  |



7. *Podocnemis tracaxa*.

*Emys tracaxa*, *Spix, Test. Bras.* p. 6, pl. v. (1824).

— *macrocephala*, *Spix, l. c.* p. v, pl. iv.

*Peltecephalus tracaxa*, *Dum. & Bibr.* ii. p. 378, pl. xviii. fig. 2 (1835); *Gray, Cat. Tort.* p. 44 (1844), and *Sh. Rept.* i. p. 61 (1855); *Strauch, Verth. Schildkr.* p. 101 (1865); *Gray, Suppl. Cat. Sh. Rept.* i. p. 84 (1870).

Carapace rather convex, obtusely keeled posteriorly. Supracaudal shield sometimes single. Plastron large, front lobe much broader than the hind lobe, which exceeds the width of the bridge; intergular shield longer than the gulars; the longest median suture is formed by the femorals; suture between the humerals about as long as that between the pectorals. Interorbital space flat, broader than the diameter of the orbit; upper jaw strongly hooked; jugal bone forming a suture with the quadrate; a very large interparietal shield, widening behind, and widely separating the parietals; the width of the mandible at the symphysis much exceeds the diameter of the orbit; alveolar surface of both jaws with a feeble median ridge. Chin with a short dermal appendage. Three very large shields on the outer border of the foot. Dark brown above, yellowish inferiorly.

Length of shell 43 centim.

Amazon, Guianas.

*a, b.* Ad., stffid.

S. America.

## Fam. 9. CHELYDIDÆ.

*Emydidæ*, part., *Gray, Ann. Phil.* (2) x. 1825.

*Emydidæ*, part., *Bell, Zool. Journ.* iii. 1828.

*Steganopodes*, part., *Wagler, Syst. Amph.* 1830.

*Chelydæ*, part., *Gray, Syn. Rept.* 1831.

*Elodites Pleurodères*, part., *Duméril & Bibron, Erp. Gén.* ii. 1835.

*Chelydidæ*, part., *Gray, Cat. Tort.* 1844, and *Sh. Rept.* i. 1855.

*Chelyoidæ*, *Hydraspididæ*, part., *Agassiz, Contr. N. H. U. S.* i. 1857.

*Chelyda*, part., *Strauch, Chelon. Stud.* 1862.

*Hydraspididæ*, *Cope, Proc. Ac. Philad.* 1868, p. 282.

*Chelydidæ*, *Hydraspididæ*, *Gray, Suppl. Cat. Sh. Rept.* i. 1870.

*Chelydidæ*, *Boulenger, Ann. & Mag. N. H.* (6) i. p. 347, 1888.

Plastral bones nine. Shell covered with epidermal shields. Neck bending under the margin of the carapace, always exposed; fifth and eighth cervical vertebræ biconvex. No bony temporal arch, but usually a parieto-squamosal; palatine bones separated by the vomer; nasals usually present; præfrontals separated from each other; dentary bones usually distinct. Digits moderately elongate; claws four or five.

South America, Australia, and New Guinea.

*Synopsis of the Genera.*

I. Neck longer than the dorsal vertebral column; jaws weak.

Nose ending in a tube; fore limb with five claws, hind limb with four; a broad parieto-squamosal arch; neural plates present.

1. **Chelys**, p. 207.

Both fore and hind limbs with four claws; nuchal shield behind the marginals, simulating a sixth vertebral; a slender parieto-squamosal arch; neural plates present . . 2. **Hydromedusa**, p. 210.

Both fore and hind limbs with four claws; intergular shield behind the gulars; no parieto-squamosal arch; no neural plates.

3. **Chelodina**, p. 213.

II. Neck shorter than the dorsal vertebral column.

A. Lower jaw narrow at the symphysis; first vertebral shield larger than second.

Neural plates present; parietal bones not expanded superiorly; parieto-squamosal arch very slender. . . 4. **Rhinemys**, p. 217.

Neural plates present; parietal bones expanded superiorly; parieto-squamosal arch strong . . . . . 5. **Hydraspis**, p. 219.

Neural plates absent; parietal bones much expanded superiorly; vertebral region grooved . . . . . 6. **Platemys**, p. 226.

B. Lower jaw, at the symphysis, at least as broad as the orbit; first vertebral shield not larger than the second.

Alveolar surface of upper jaw without median ridge.

7. **Emydura**, p. 228.

Alveolar surface of upper jaw with a median ridge.

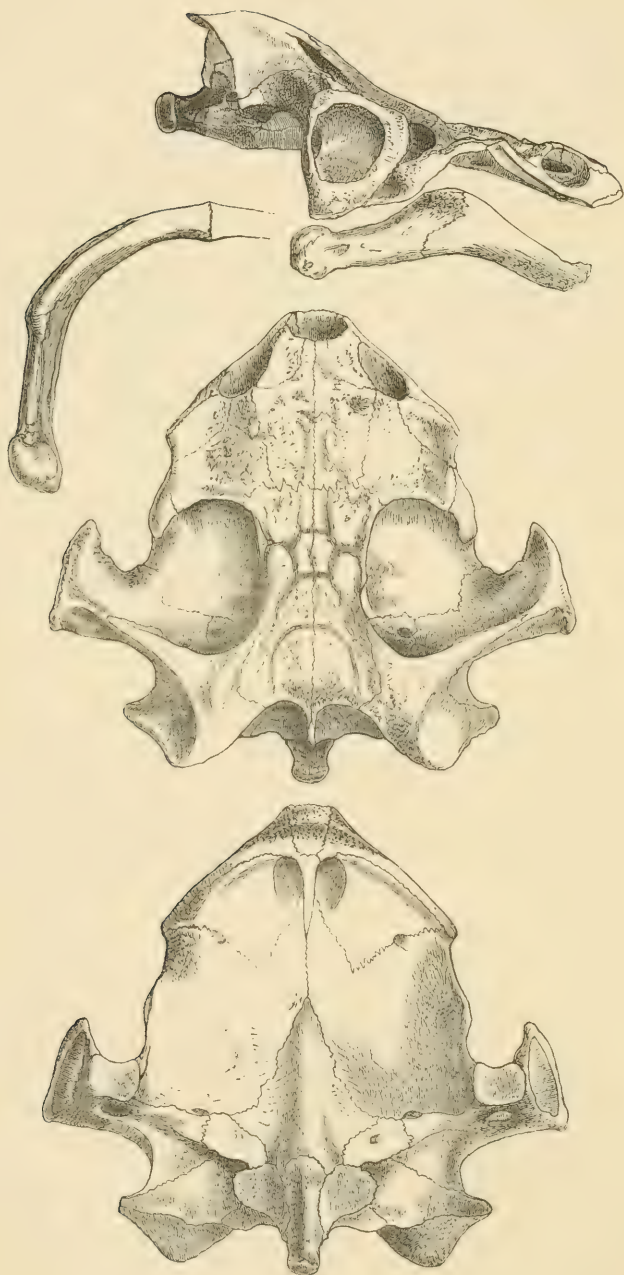
8. **Elseya**, p. 234.

## 1. CHELYS.

*Chelys*, *Dumér. Zool. Anal.* p. 76 (1806); *Fitzing. N. Classif. Rept.* p. 7 (1826); *Wagler, Syst. Amph.* p. 134 (1830); *Gray, Syn. Rept.* p. 43 (1831); *Dum. & Bibr. ii.* p. 454 (1835); *Gray, Cat. Tort.* p. 44 (1844), and *Sh. Rept. i.* p. 60 (1855); *Strauch, Chelon. Stud.* p. 49 (1862); *Gray, Suppl. Cat. Sh. Rept. i.* p. 71 (1870).  
Matamata, *Merrem, Tent.* p. 21 (1820).

Neural plates present, seven in number, the last pair of costals forming a suture; nuchal shield present, marginal; plastron narrow, with very strong axillary and inguinal buttresses, the latter ankylosed to the fourth costal plate. Neck longer than the dorsal vertebral column. No separate nasal bones; a strong supraoccipital

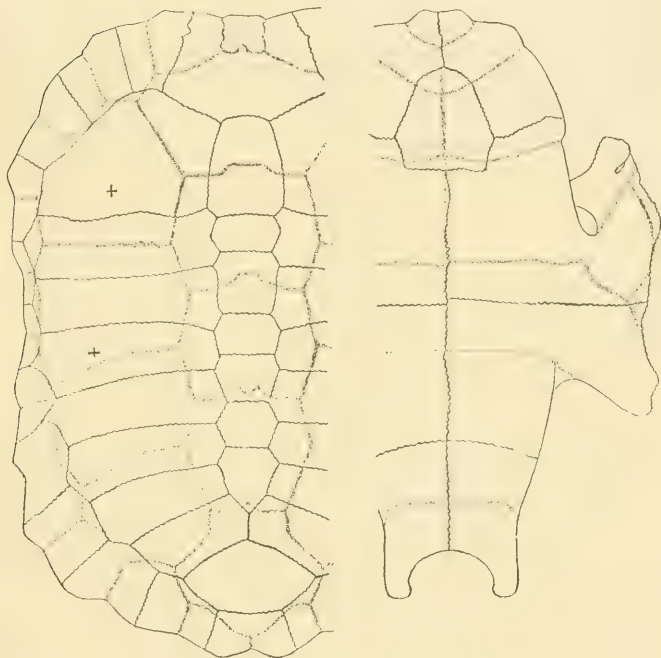
Fig. 52.

Skull of *Chelys fimbriata*.

arch; jaws very weak, without horny beak; eyes extremely small; nose produced into a long tube; a large dermal appendage above the ear, and smaller ones on the neck and chin. Digits entirely webbed.

North-eastern South America.

Fig. 53.



Shell of *Chelys fimbriata*.

### 1. *Chelys fimbriata*.

*Testudo fimbriata*, *Schneid. Schildkr.* p. 349 (1783); *Schoepff, Test* p. 97, pl. xxi. (1792).

— *matamata*, *Bruguère, Journ. d'Hist. Nat.* 1792, p. 253, pl. xiii.; *Daud. Rept.* ii. p. 86, pl. xx. (1802).

? *Testudo hispinosa*, *Daud. l. c.* p. 94.

*Chelys fimbriata*, *Schweigg. Prodr.* p. 25 (1814); *Sprx, Test. Bras.* pl. xi. (1824); *Strauch, Chelon. Stud.* p. 171 (1862), and *Verth. Schildkr.* p. 121 (1865); *Günth. Tr. Zool. Soc.* xi. p. 215, pl. xlii. (1882).

? *Chelys hispinosa*, *Schweigg. l. c.*

*Matamata fimbriata*, *Merr. Tent.* p. 21 (1820).

*Chelys matamata*, *Wagl. Syst. Amph.* pl. iii. figs. i.-xxiv. (1830); *Dum. & Bibr.* ii. p. 455, pl. xxi. fig. 2 (1835); *Gray, Cat. Tort.* p. 44 (1844), and *Sh. Rept.* i. p. 60 (1855).

Carapace with three series of large nodose protuberances or keels, the shields very rugose, with strong radiating striæ; posterior margin more or less strongly serrated; vertebral shields broader than long, about as broad as costals. Plastron suberuciform, front lobe rounded, broader than the hind lobe, which is deeply notched; plastral shields very variable in shape, femorals constantly the longest; intergular either small and separating the gulars only anteriorly, or large and widely separating the latter shields; axillary and inguinal shields indistinct. Head extremely depressed, triangular, covered with small warts or granules. Limbs with small scales, the largest of which are crescentic. Brown; young elegantly marked with brown and yellow bands along the chin and neck, and with black and yellow spots on the shell.

Length of shell 38 centim.

Guianas, Northern Brazil.

- |                                                  |                 |                     |
|--------------------------------------------------|-----------------|---------------------|
| a. Yg., spir.                                    | Cayenne.        |                     |
| b. ♀, stffd.                                     | Cayenne.        |                     |
| c, d. ♂, stffd.                                  | Brazil.         |                     |
| e. Yg., spir.                                    | Manáos, Brazil. | M. A. Peixoto [C.]. |
| f, g. Ad., skels.                                | — ?             |                     |
| h. Eggs, laid in the Zoological Gardens, London. |                 |                     |

## 2. HYDROMEDUSA.

Chelodina, part., *Fitzing. N. Class. Rept.* p. 6 (1826); *Dum. & Bibr.* ii. p. 441 (1835).

Hydromedusa, *Wagler, Syst. Amph.* p. 135 (1830); *Gray, Cat. Tort.* p. 43 (1844), and *Sh. Rept.* i. p. 59 (1855); *Strauch, Chelon. Stud.* p. 47 (1862); *Gray, Suppl. Cat. Sh. Rept.* i. p. 73 (1870); *Günth. Ann. & Mag. N. H.* (5) xiv. p. 422 (1884).

Hydraspis, part., *Gray, Syn. Rept.* p. 39 (1831).

Chelomedusa, *Gray, Ann. & Mag. N. H.* (4) xi. p. 303 (1873).

Neural plates present, seven in number, the last pair of costals forming a suture; nuchal shield present, situated behind the anterior marginals, simulating a sixth vertebral; plastron large, with moderately strong axillary and feeble inguinal buttresses, the latter just reaching the fourth costal plate. Neck longer than the dorsal vertebral column. A slender supraoccipital arch; jaws weak, without alveolar ridges; a strong fold at the angle of the mouth, connecting both jaws. No dermal appendages on the chin. Both pairs of limbs with four claws; digits entirely webbed.

South America.

### 1. *Hydromedusa maximiliani*.

*Emys maximiliani*, *Mikan, Delect. Flor. et Faun. Bras.* pl. — (1820).

*Chelodina maximiliani*, *Fitzing. N. Class. Rept.* p. 45 (1826).

*Hydraspis maximiliani*, *Gray, Syn. Rept.* p. 43 (1831).



*Chelodina flavilabris*, *Dum. & Bibr.* ii. p. 446 (1835); *Guich. in Casteln. Voy. Amér. Sud, Rept.* p. 8, pl. ii. (1855).

*Hydromedusa maximiliani*, *Gray, Cat. Tort.* p. 44 (1844); *Günth. Ann. & Mag. N. H.* (5) xiv. p. 422 (1884).

— *subdepressa*, *Gray, Proc. Zool. Soc.* 1852, p. 134.

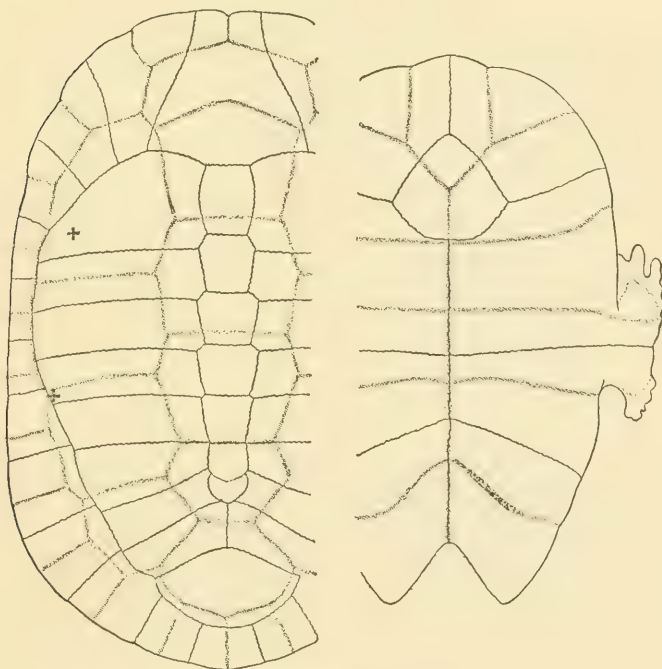
— *flavilabris*, *Gray, Cat. Tort.* p. 44, and *Sh. Rept.* i. p. 59 (1855); *Strauch, Chelon. Stud.* p. 162 (1862); *Gray, Ann. & Mag. N. H.* (4) xi. p. 304 (1873).

— *depressa*, *Gray, Cat. Sh. Rept.* i. p. 60, pl. xxvi., and *Suppl.* p. 72 (1870), and *Ann. & Mag. N. H.* (4) xi. p. 303; *Günth. l. c.* p. 423.

— *bankae*, *Giebel, Zeitschr. ges. Naturw.* xxvii. p. 19, pl. iv. (1866); *Gray, Ann. & Mag. N. H.* (4) xi. p. 303.

Carapace very much depressed, with a single obtuse keel, which disappears in the adult; dorsal shields concentrically striated in the

Fig. 54.



Shell of *Hydromedusa tectifera*.

young, smooth in the adult; nuchal shield very variable in shape and in size, either narrower or broader than the first vertebral, proportionally larger in the young, in which it nearly equals in length the latter shield. Plastron large, notched behind, with narrow

bridge. Snout short, obtusely pointed, slightly prominent; head covered above with undivided smooth skin; sides of neck with conical erect tubercles. Interdigital web moderately developed; three or four large transverse lamellæ on the upper surface of the fore limb. Carapace brown; plastron brown in the adult, yellow spotted with brown in the young; head, neck, and limbs dark olive above, white inferiorly, the limit between the two colours sharply defined.

Length of shell 17 centim.

Brazil.

|                              |         |                                |
|------------------------------|---------|--------------------------------|
| <i>a, b.</i> ♀ & hgr., spir. | Brazil. |                                |
| <i>c.</i> ♀, spir.           | Brazil. | (Type of <i>H. depressa</i> .) |
| <i>d.</i> Hgr. stfdd         | Brazil. |                                |
| <i>e.</i> Yg., shell.        | Brazil. | Mrs. Miers [P.].               |

## 2. *Hydromedusa tectifera*.

*Hydromedusa maximiliani* (*non Mik.*), *Wagl. Syst. Amph.* p. 135, pl. iii. figs. 25-42 (1830); *Peters, Arch. f. Anat. u. Phys.* 1839, p. 280, pl. xiv. figs. 1-4; *Gray, Cat. Sh. Rept.* i. p. 59 (1855), and *Suppl.* p. 73 (1870), and *Ann. & Mag. N. H.* (4) xi. p. 302 (1873); *Burmeister, An. Soc. Sc. Argent.* xxi. p. 5 (1886).

*Chelodina maximiliani*, *Dum. & Bibr.* ii. p. 449 (1835); *Hensel, Arch. f. Nat.* 1868, p. 355.

*Hydromedusa tectifera*, *Cope, Proc. Am. Philos. Soc.* xi. p. 147 (1869); *Gray, Suppl.* p. 73; *Bouleng. Ann. & Mag. N. H.* (5) xvi. p. 85 (1885).

— *platanensis*, *Gray, Ann. & Mag. N. H.* (4) xi. p. 302 (1873); *Günth. Ann. & Mag. N. H.* (5) xiv. p. 423, pl. xiv. (1884).

— *wagleri*, *Günth. l. c.* p. 423.

Each dorsal shield, in the young, concentrically striated and with a conical central nodosity; these nodosities disappearing in the adult, except on the hinder shields. Upper surface of head reticulated or divided into numerous small irregular shields. Digits extensively webbed. Carapace dark brown; plastron yellowish, with dark brown spots in the young; head and neck olive, with a broad, white, black-edged, lateral band, and a curved white streak on each side of the throat.

Length of shell 20 centim.

Southern Brazil to Buenos Ayres.

|                                |                           |                                                    |
|--------------------------------|---------------------------|----------------------------------------------------|
| <i>a-b.</i> ♂ & yg., spir.     | Rio Grande do Sul.        | Dr. v. Ihering [C.].                               |
| <i>c.</i> Eggs.                | Rio Grande do Sul.        | Dr. v. Ihering [C.].                               |
| <i>d.</i> ♂, stfdd.            | Buenos Ayres.             | (Type of <i>H. wagleri</i> .)                      |
| <i>e.</i> ♀, shell, imperfect. | Rio de la Plata.          | M. Bravard [C.]. (Type of <i>H. platanensis</i> .) |
| <i>f.</i> Yg., spir.           | South of Rio de la Plata. | Lieut. Gairdner [P.].                              |

## 3. CHELODINA.

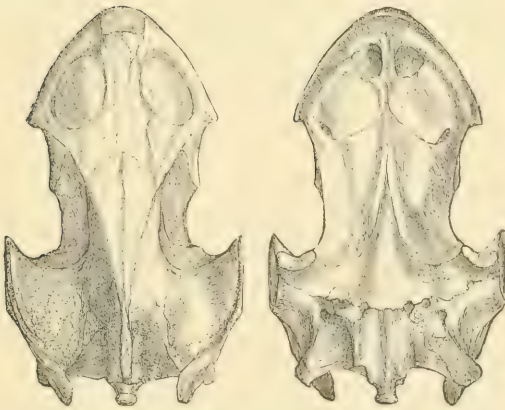
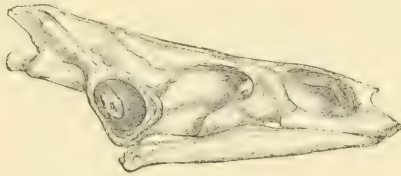
Chelodina, part., *Fitzing. N. Class. Rept.* p. 6 (1826); *Dum. & Bibr.* ii. p. 441 (1835).

Hydraspis, part., *Bell, Zool. Journ.* iii. p. 511 (1828).

Chelodina, *Gray, Syn. Rept.* p. 38 (1831), and *Cat. Tort.* p. 43 (1844), and *Sh. Rept.* i. p. 58 (1855); *Strauch, Chelon. Stud.* p. 48 (1862); *Gray, Suppl. Cat. Sh. Rept.* i. p. 71 (1870).

Neural plates absent; nuchal shield present, marginal; plastron with moderately strong axillary, and feeble inguinal buttresses, the latter just reaching the fifth costal plate; intergular shield large, and situated behind the gulars, between the humerals and the pectorals. Neck longer than the dorsal vertebral column. No parieto-

Fig. 55.



Skull of *Chelodina oblonga*. (From Gray, P. Z. S. 1869.)

squamosal arch; jaws weak, without alveolar ridges. No dermal appendages on the chin. Both pair of limbs with four claws; digits entirely webbed.

Australia and New Guinea.

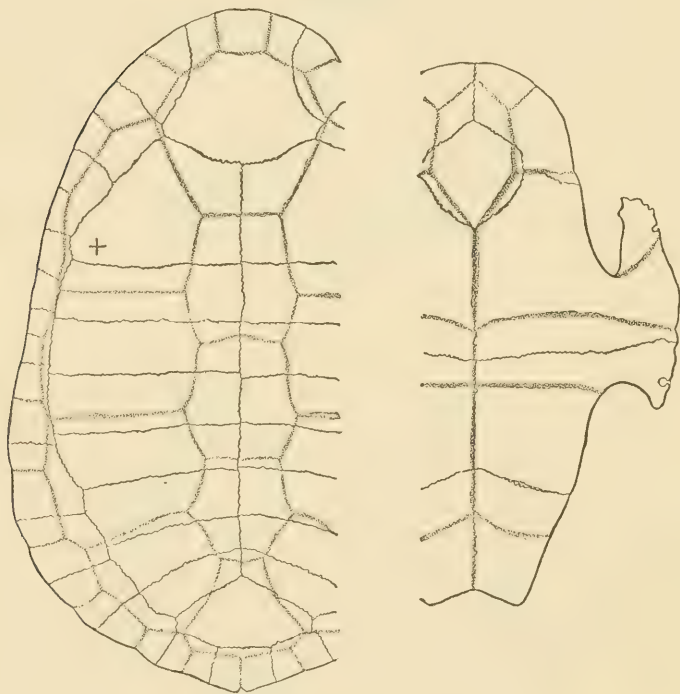
*Synopsis of the Species.*

I. Intergular more than twice as long as the suture between the pectorals.

Front lobe of plastron nearly as wide as the carapace anteriorly ..... 1. *longicollis*, p. 213.

Front lobe of plastron much narrower than the carapace ..... 2. *novæ-guinææ*, p. 215.

Fig. 56.

Shell of *Chelodina oblonga*.

II. Pectorals at least as long as the intergular, which is not twice as long as the suture between the pectorals.

Plastron (without the bridge) about twice as long as wide ..... 3. *expansa*, p. 216.

Plastron more than twice as long as wide . 4. *oblonga*, p. 216.

1. *Chelodina longicollis*.

- Testudo longicollis*, *Shaw, Zool.* iii. p. 62, pl. xvi. (1802).  
*Emys longicollis*, *Schweigg. Prodr.* p. 40 (1814).  
*Hydraspis longicollis*, *Bell, Zool. Journ.* iii. p. 512 (1828).  
*Chelodina longicollis*, *Gray, Syn. Rept.* p. 39 (1831); *Bell, Test.*  
 pl. — (1842); *Gray, Cat. Tort.* p. 43 (1844), and *Sh. Rept.* i. p. 53  
 (1855); *Stranch, Chelon. Stud.* p. 164 (1862), and *Verth. Schildkr.*  
 p. 119 (1865); *Gray, Suppl. Cat. Sh. Rept.* i. p. 72 (1870); *McCoy,*  
*Prodr. Zool. Viet.* pls. xcii. & xciii. (1885).  
 — novæ-hollandiæ, *Dum. & Bibr.* ii. p. 445, pl. xxi. fig. 2 (1835).  
 — sulcifera, *Gray, Cat. Sh. Rept.* i. p. 59, pl. xxv. fig. 2.  
 — sulcata, *Gray, Proc. Zool. Soc.* 1855, p. 201.

Carapace much depressed, oval, broadest behind, grooved along the vertebral region in the adult; dorsal shields with radiating striae in the young, with vermicular rugosities in the adult; nuchal shield large, usually considerably longer than broad; first vertebral shield very large, fourth smallest. Plastron very large, its width (without the bridge) about half the length of the carapace, feebly angulated laterally; front lobe nearly as wide as the carapace anteriorly, usually a little wider than the hind lobe, which is angularly notched posteriorly; the longest plastral shield is the intergular, which is more than twice as long as the suture between the pectorals; suture between the anals as long as, or longer than, that between the femorals. Head small; snout short, obtuse; interorbital space narrow; width of the lower jaw at the symphysis much less than half the diameter of the orbit. Neck and sides of head tubercular. Upper surface of fore limb and lower surface of hind limb near the heel with large transverse lamellæ, four or five in number on the arm; digits very broadly webbed. Dark brown above; plastron and lower surface of marginals yellow, with broad black lines along the sutures between the shields.

Length of shell 24 centim.

South Australia.

|                                   |                  |                               |
|-----------------------------------|------------------|-------------------------------|
| <i>a.</i> Hgr., stffld.           | Australia.       | Sir J. Banks [P.]. (Type.)    |
| <i>b.</i> Yg., spir.              | New South Wales. | G. Krefft, Esq. [P.].         |
| <i>c.</i> ♀, spir.                | Australia.       |                               |
| <i>d, e, f.</i> ♀ & hgr., stffld. | Australia.       |                               |
| <i>g.</i> Ad., skel.              | Australia.       |                               |
| <i>h.</i> Ad., shell.             | Australia.       |                               |
| <i>i.</i> Hgr., shell.            | Australia.       | (Type of <i>C. sulcata</i> .) |

2. *Chelodina novæ-guinææ*. (PLATES V. & VI.)

*Chelodina novæ-guinææ*, *Bouleng. Ann. Mus. Genova* (2) vi. p. 450 (1888).

Carapace as in *C. longicollis*. Plastron intermediate in size between that of the latter and that of *C. expansa*; front lobe a little wider than hind lobe and considerably shorter and narrower than the corresponding half of the carapace; the width of the plastron without the bridge is a little more than half its length; the longest plastral shield is the intergular, which is nearly three times as long



as the suture between the pectorals; suture between the anals about twice as long as that between the femorals. Head a little larger than in *C. longicollis*, with stronger lower jaw; the diameter of the latter at the symphysis is more than half the diameter of the orbit. Five broad transverse lamellæ on the upper surface of the fore limb. Chestnut-brown above, brownish yellow inferiorly.

Length of shell 14 centim.

New Guinea.

a. Hgr. ♀, spir.

Katow.

M. L. D'Albertis [C].  
Marquis G. Doria [P].  
(One of the types.)

### 3. *Chelodina expansa*.

*Chelodina expansa*, Gray, *Proc. Zool. Soc.* 1856, p. 370, pl. xii., and *Suppl. Cat. Sh. Rept.* i. p. 72 (1870), and *Proc. Zool. Soc.* 1870, pl. xxxiv.

Carapace neither keeled nor grooved; nuchal shield longer than broad. Plastron intermediate, as to size and shape, between *C. novæ-guinææ* and *C. oblonga*, strongly angulated laterally; lobes considerably shorter and narrower than the opening of the shell; the width of the plastron, without the bridge, is contained twice in its length; the longest plastral shields are the pectorals; intergular once and a half as long as the suture between the pectorals; suture between the anals shorter than that between the femorals. A series of seven or eight transverse lamellæ on the upper surface of the fore limb. Carapace brown, plastron pale brown; soft parts olive above, yellowish white below.

Length of shell 26 centim.

Queensland.

a. ♂, stf'd.

N. Australia.

Mr. Stutchbury [C]. } (Types.)

b. Yg., carapace.

N. Australia.

Mr. Stutchbury [C]. }

c. ♂, spir.

Gaydah.

Museum Godeffroy.

### 4. *Chelodina oblonga*.

*Chelodina oblonga*, Gray, in *Grey's Trav. Austr.* ii. p. 446, pl. vii. (1841), and *Cat. Tort.* p. 43 (1844), and *Sh. Rept.* i. p. 58, pl. xxiv. (1855); *Strauch, Chelon. Stud.* p. 165 (1862).

— *collei*, Gray, *Proc. Zool. Soc.* 1855, p. 200, and *Cat. Sh. Rept.* i. p. 59, and *Suppl.* p. 72 (1870).

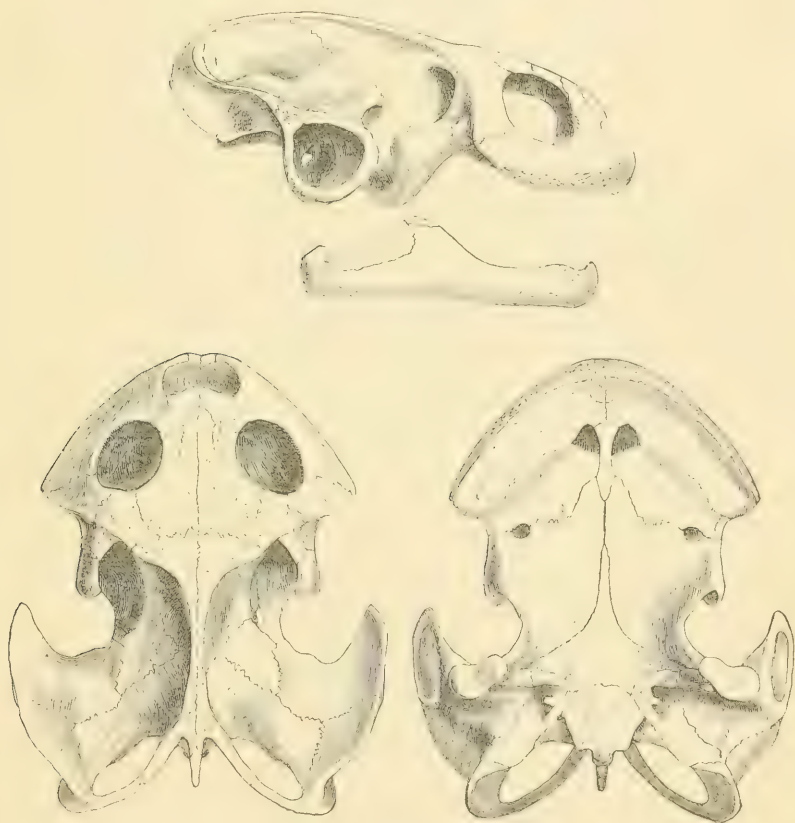
Carapace narrow, broadest behind, the males with a feeble vertebral keel; nuchal shield as long as broad or a little broader than long. Plastron small, cruciform, angulated laterally, its longitudinal portion more than twice as long as wide; the longest plastral shields are the pectorals, which at least equal the intergular in length; intergular as long as or a little longer than the suture between the pectorals; suture between the anals as long as, or shorter than, that between the femorals. A series of six or seven transverse lamellæ on the fore limb. Brown above, yellow inferiorly.

Length of shell 23 centim.

North and West Australia.

|                       |                 |                   |                                      |
|-----------------------|-----------------|-------------------|--------------------------------------|
| <i>a.</i> ♂, stffl.   | W. Australia.   | (Type.)           | } (Types of<br><i>C. colletti</i> .) |
| <i>b.</i> ♂, stffl.   | Swan River.     | Haslar Hospital.  |                                      |
| <i>c.</i> ♂, stffl.   | Swan River.     | Sir J. Richardson |                                      |
|                       |                 | [P.]              |                                      |
| <i>d.</i> Yg., spir.  | Swan River.     | Sir J. Richardson |                                      |
|                       |                 | [P.]              |                                      |
| <i>e.</i> ♀, stffl.   | Port Essington. | Capt. W. Chambers | [P.]                                 |
| <i>f.</i> ♀, stffl.   | Port Essington. |                   |                                      |
| <i>g.</i> ♂, skel.    | N. Australia.   |                   |                                      |
| <i>h.</i> Ad., shell. | N. Australia.   |                   |                                      |

Fig. 57.

Skull of *Rhinemys nasuta*.

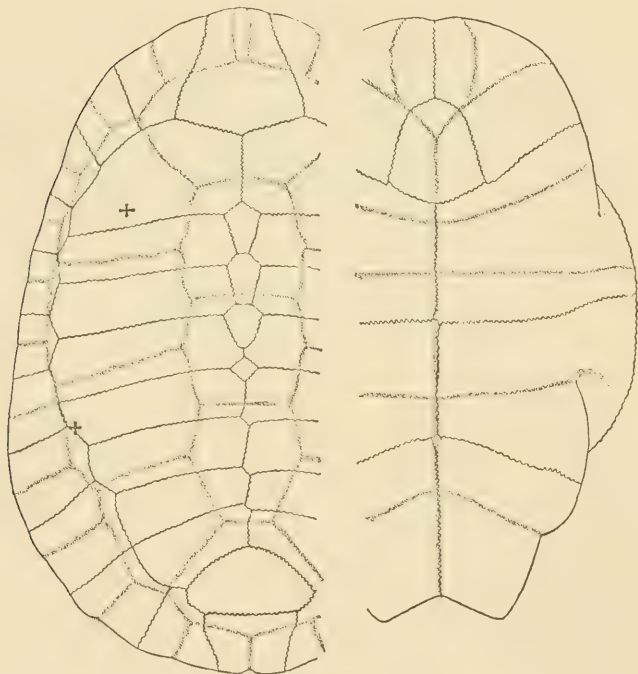
## 4. RHINEMYS.

*Rhinemys*, part., *Wagler, Syst. Amph.* p. 134 (1830).  
*Hydraspis*, part., *Gray, Syn. Rept.* p. 39 (1831), and *Cat. Tort.* p. 38 (1844), and *Sh. Rept.* i. p. 54 (1855), and *Suppl.* p. 73 (1870).  
*Platemys*, part., *Dum. & Bibr.* ii. p. 404 (1835); *Strauch, Chelon. Stud.* p. 45 (1862).

Neural plates present, four in number; nuchal shield present, marginal. Plastron large, with very strong axillary, and moderately strong inguinal buttresses, the latter ankylosed to the fifth costal plate. A very slender parieto-squamosal arch; parietals not expanded superiorly; jaws moderately strong, without alveolar ridges. Chin with a pair of dermal appendages. Digits entirely webbed.

South America.

Fig. 58.



Shell of *Rhinemys nasuta*.

### 1. *Rhinemys nasuta*.

*Emys nasuta*, Schweigg. Prodr. p. 29 (1814).

— *barbatula*, Gravenh. Delic. Mus. Zool. Vratisl. p. 15, pl. v. figs. 3 & 4 (1829).

*Hydraspis barbatula*, Gray, Syn. Rept. p. 43 (1831).

*Platemys schweiggeri*, Dum. & Bibr. ii. p. 435 (1835).

*Hydraspis nasuta*, Gray, Cat. Tort. p. 40 (1844).

— *spixii* (non D. & B.), Gray, Proc. Zool. Soc. 1852, p. 134.

— *raniceps*, Gray, Cat. Sh. Rept. i. p. 55, pl. xxiii., and Proc. Zool. Soc. 1864, p. 130, and Suppl. Cat. Sh. Rept. i. p. 74 (1870), and Ann. & Mag. N. H. (4) xi. p. 74, fig. (1873).

*Platemys nasuta*, *Strauch, Chelon. Stud.* pp. 47 & 160 (1862).

— *raniceps*, *Strauch, l. c.* p. 47.

*Hydraspis maculata*, *Gray, Ann. & Mag. N. H.* (4) xi. p. 305 (1873).

Carapace much depressed, with at least a trace of a vertebral keel. Front lobe of plastron broader than hind lobe; intergular shield shorter than its distance from the abdominals; suture between the latter shields usually longer than that between the pectorals. Head extremely large, covered with numerous small shields; mental barbels short, shorter than the diameter of the eye. Uniform brown above; plastron brown, bordered with yellow all round; bridge and lower surface of marginals yellow; a broad yellow band covers the labial and tympanic regions.

Length of shell 30 centim.

Northern Brazil, Guianas, Venezuela.

|                          |            |                                                        |
|--------------------------|------------|--------------------------------------------------------|
| <i>a.</i> Ad., stfld.    | Para.      | H. W. Bates, Esq. [C.]. (Type of <i>H. raniceps</i> .) |
| <i>b, c.</i> Ad., stfld. | Surinam.   |                                                        |
| <i>d.</i> Hgr., stfld.   | Venezuela. | Sir Rawson Rawson [P.].                                |
| <i>e.</i> Yg., spir.     | — ?        | (Type of <i>H. maculata</i> .)                         |
| <i>f.</i> Ad., skel.     | — ?        |                                                        |

## 5. HYDRASPIS\*.

*Chelodina*, part., *Fitzing. N. Class. Rept.* p. 6 (1826).

*Hydraspis*, part., *Bell, Zool. Journ.* iii. p. 511 (1828); *Gray, Syn.*

*Rept.* p. 39 (1831), and *Cat. Tort.* p. 38 (1844), and *Cat. Sh. Rept.* i. p. 54 (1855), and *Suppl.* p. 73 (1870).

*Rhinemys*, part., *Wagler, Syst. Amph.* p. 134 (1830).

*Phrynops*, *Wagler, l. c.* p. 135; *Gray, Cat. Tort.* p. 41.

*Platemys*, part., *Dunn. & Bibr.* ii. p. 404 (1835); *Strauch, Chelon. Stud.* p. 45 (1862).

*Spatulemys*, *Gray, Ann. & Mag. N. H.* (4) x. p. 463 (1873).

*Mesoclemmys*, *Gray, l. c.* (4) xi. p. 305 (1873).

Neural plates present, six in number; nuchal shield present, marginal. Plastron large, with a very strong axillary and moderately strong inguinal buttresses, the latter anchylosed to the fifth costal plate. A parieto-squamosal arch; parietals more or less expanded superiorly. Jaws moderately strong, without alveolar ridges. Chin with a pair of dermal appendages, or barbels. Digits entirely webbed.

South America.

The following characters apply to all the species:—

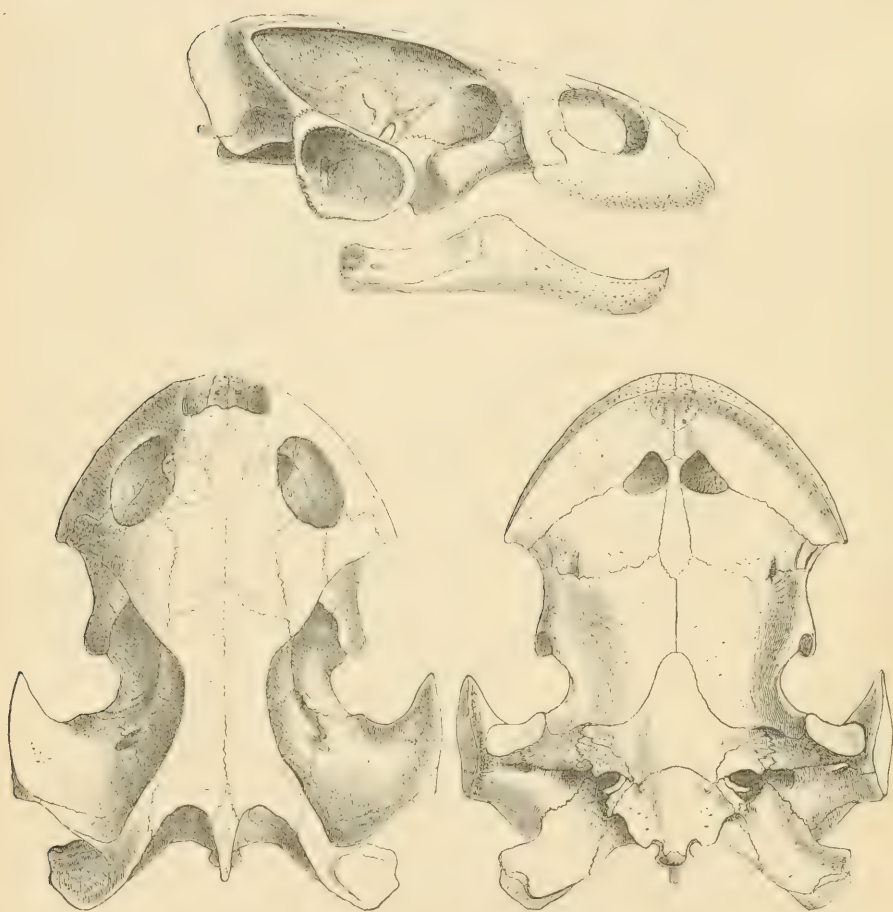
Carapace much depressed, smooth in the adult; vertebrals very broad in the young, broader than the costals, much narrower in

\* 1. *Hydraspis? affinis*, *Gray, Cat. Tort.* p. 41 (1844).—Brazil.

2. *Phrynops bellii*, *Gray, l. c.* p. 41.—Hab.?

the adult, in which the first is the broadest and the fourth the narrowest; nuchal rather large, at least twice as long as broad. Plastron large, deeply notched posteriorly, slightly concave in the male; width of the bridge contained three and a half to four times in the length of the plastron; axillary and inguinal shields very small

Fig. 59.

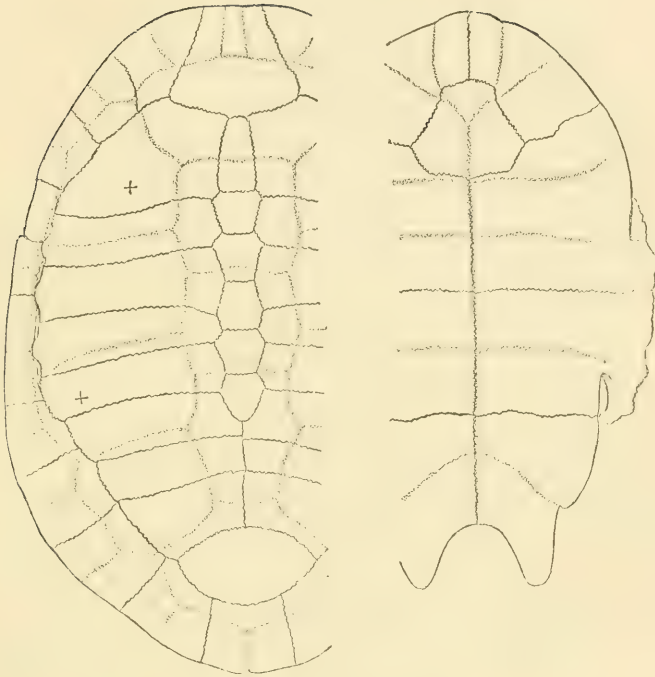


Skull of *Hydraspis hilarii*.

or absent. Snout rather pointed, with the nasal region very slightly produced. Upper surface of neck with small warts. Limbs very broadly webbed, fringed on the outer side, covered anteriorly with unequal transverse scales; a prominent series of enlarged tubercular scales along the inner edge of the leg.



Fig. 60.

Shell of *Hydraspis hilarii*.*Synopsis of the Species.*

## I. Skin of upper surface of head divided into several small shields.

A. Mental barbels large, widening distally, club-shaped; plastron yellow with large black spots . . . . . 1. *hilarii*, p. 222.

## B. Mental barbels narrow.

1. Carapace with three tuberculate ridges in the halfgrown; plastron with symmetrical black markings. 2. *tuberosa*, p. 223.

2. Carapace with a single keel.

Mental barbels as long as the diameter of the eye, black at the base; head and neck with symmetrical black bands; carapace pale brownish, vermiculated with black. . . . . 3. *geoffroyana*, p. 223.

Mental barbels shorter than the diameter of the eye; interangular shield shorter than its distance from the abdominals . . . . . 4. *gibba*, p. 224.

Mental barbels shorter than the diameter of the eye; intergular shield longer than its distance from the abdominals . . . . . 5. *radiolata*, p. 225.

II. Skin of median upper surface of head undivided.

Suture between the pectoral shields longer than that between the abdominals . . . . . 6. *rufipes*, p. 225.

Suture between the pectoral shields shorter than that between the abdominals . . . . . 7. *vagleri*, p. 225.

### 1. *Hydraspis hilarii*.

*Phrynops geoffroyana* (*non Schweigg.*), *Wagl. Syst. Amph.* p. 135, pl. v. figs. xlviii.-li. (1830), and *Icones*, pl. xxvi. (1833).

*Platemys geoffreyana*, *juv.*, *Dum. & Bibr.* ii. p. 421 (1835).

— *hilarii*, *Dum. & Bibr.* p. 428; *Guichen. in Casteln. Voy. Amér. Sud. Rept.* p. 7, pl. i. (1855); *Burmeister, Reise La Plata*, ii. p. 521 (1861).

*Hydraspis hilarii*, *Gray, Cat. Tort.* p. 40 (1844), and *Sh. Rept.* i. p. 57 (1855).

*Platemys geoffreyana*, *part.*, *Hensel, Arch. f. Nat.* 1868, p. 350.

*Spatulemys lasalæ*, *Gray, Ann. & Mag. N. II.* (4) x. p. 463 (1872), and xi. p. 73, pl. ii. (1873).

Carapace with a very feeble vertebral keel, which may disappear in the adult; dorsal shields of young not gibbose, but with concentric and radiating striæ. Front lobe of plastron broader than hind lobe; intergular shield as long as its distance from the abdominals in the young, shorter in the adult; suture between the pectorals much shorter than that between the abdominals. Median region of upper surface of head divided into irregular shields, among which a small azygos frontal is constantly distinct; parietal bones above as wide as the diameter of the orbit; mental barbels at least as long as the diameter of the eye, club-shaped, narrowest at the base. Olive above, edge of carapace yellow; some of the marginals usually with one or two small black spots; plastron and lower surface of marginals yellow, with black spots disposed more or less symmetrically; a black line on each side of the head and neck, passing through the eye; lower surface of head and neck, and tympanum, yellow; each barbel with a black ring; a black line on each side of the throat, behind the barbels, sometimes connected with the lateral line on the neck; lower surface of neck with a few black spots; inner surface of limbs yellow, with one or more black spots or streaks; hinder side of thighs with a black band.

Length of shell 34 centim.

South America between the Amazons and the Parana.

|                                                   |                                 |                                                            |
|---------------------------------------------------|---------------------------------|------------------------------------------------------------|
| <i>a</i> , <i>b-f</i> . ♂ ♀, hgr.<br>& yg., spir. | Rio Grande do Sul.              | Dr. II. v. Ihering [C.].                                   |
| <i>g</i> . ♂, skel.                               | Rio Grande do Sul.              | Dr. II. v. Ihering [C.].                                   |
| <i>h</i> . ♂, stfild.                             | R. Parana, Prov.<br>Corrientes. | Col. Perez de Lasala [P.].<br>(Type of <i>S. lasalæ</i> .) |
| <i>i</i> . ♀, spir.                               | Buenos Ayres.                   | W. White, Esq. [C.].                                       |
| <i>k</i> . ♂, stfild.                             | — ?                             |                                                            |

2. *Hydraspis tuberosa*.

*Hydraspis depressa* (non Merr.), Gray, *Cat. Sh. Rept.* i. p. 57 (1855).

*Platemys hilarii* (non D. & B.), Trosch. in Schomburgk, *Reis. Brit. Guiana*, iii. p. 647 (1848).

— *depressa*, juv., Strauch, *Chelon. Stud.* p. 153 (1862).

— *tuberosa*, Peters, *Mon. Berl. Ac.* 1870, p. 311, pl. —.

*Hydraspis tuberosa*, Gray, *Suppl. Cat. Sh. Rept.* i. p. 75 (1870).

Carapace with a vertebral keel, and a lateral keel or series of knobs along the costals. Front lobe of plastron broader than hind lobe; intergular shield usually as long as its distance from the abdominals; suture between the pectorals usually shorter than that between the abdominals. Median region of upper surface of head divided into irregular shields; parietal bones above wider than the diameter of the orbit; mental barbels a little shorter than the diameter of the eye. Brownish above, edge of carapace yellow; plastron and lower surface of marginals yellow, with symmetrical black spots and vermiculations; the black spots under the anterior half of the margin confluent into a band; a black streak on each side of the head and neck, passing through the eye, often uniting with another behind the tympanum; a crescentic black streak on the chin, embracing the base of the barbels; throat yellow, with black spots and marblings; inner side and borders of limbs yellow.

The shell of the specimen described by Peters measures 127 millim.

British Guiana.

|               |                 |                         |
|---------------|-----------------|-------------------------|
| a. Yg., spir. | British Guiana. | Sir R. Schomburgk [P.]. |
| b. Yg., spir. | — ?             | Dr. Rüppell [P.].       |
| c. Yg., spir. | — ?             |                         |

3. *Hydraspis geoffroyana*.

*Emys geoffroyana*, Schweigg. *Prodr.* p. 33 (1814).

— *depressa*, Merr. *Tent.* p. 22 (1820); Wied, *Beitr.* i. p. 29 (1825), and *Abbild.* pl. — (1831).

? *Emys viridis*, Spix, *Test. Bras.* p. 3, pl. ii. fig. 4 & pl. iii. fig. 1 (1824).

*Chelodina geoffroyana*, Fitz. *N. Cl. R.* p. 45 (1826).

*Hydraspis depressa*, Gray, *Syn. Rept.* p. 41 (1831).

? *Hydraspis viridis*, Gray, *l.c.*

*Platemys geoffroyana*, Dum. & Bibr. ii. p. 418 (1835); Strauch, *Chelon. Stud.* p. 152 (1862).

— *neuwiedii*, Dum. & Bibr. p. 425.

*Phrynops geoffroyana*, Gray, *Cat. Tort.* p. 41 (1844).

*Hydraspis geoffroyana*, Gray, *Cat. Sh. Rept.* i. p. 57 (1855).

*Platemys depressa*, Strauch, *l.c.* p. 153.

— *geoffroyana*, part., Hensel, *Arch. f. Nat.* 1868, p. 350.

Carapace with a very feeble vertebral keel, which disappears in the adult. Front lobe of plastron slightly broader than hind lobe; intergular shield shorter than its distance from the abdominals; suture between the pectorals as long as or shorter than that between

the abdominals. Median region of upper surface of head divided into irregular shields; parietal bones above wider than the diameter of the orbit; mental barbels as long as the diameter of the eye. Carapace yellowish brown above, closely striated or vermiculated with black; plastron and lower surface of marginals olive or brown; head olive above, marbled with black; a broad black band on each side of the head and neck, passing through the eye; another parallel black band along the upper lip and side of neck; throat and lower surface of neck yellow; a horseshoe-shaped black band on the chin, embracing the base of the barbels; lower surface of neck with black spots or interrupted longitudinal bands; limbs olive, yellowish on the inner side.

Length of shell 25 centim.

Brazil.

a-c. ♀ & hgr., spir.

Rio Grande do Sul.

Dr. v. Ihering [C.]

#### 4. *Hydraspis gibba*.

*Emys gibba*, Schweigg. *Prodr.* p. 30 (1814).

? *Emys radiolata*, Wied, *Abbild.* pls. — (1831).

? *Platemys radiolata*, Dum. & Bibr. ii. p. 412 (1835).

*Platemys gibba*, Dum. & Bibr. p. 416, pl. xx. fig. 2.

? *Platemys miliusii*, Dum. & Bibr. p. 431.

*Hydraspis gibba*, Gray, *Cat. Tort.* p. 40 (1844), and *Sh. Rept.* i. p. 55 (1855).

? *Phrynops ? miliusii*, Gray, *Cat. Tort.* p. 42.

*Hydraspis nasuta*, Gray, *Cat. Sh. Rept.* i. p. 55.

? *Hydraspis miliusii*, Gray, *l. c.* p. 56.

*Hydraspis gordonii*, Gray, *Proc. Zool. Soc.* 1868, p. 563, pl. xlii., and *Suppl. Cat. Sh. Rept.* i. p. 74 (1870).

— *bicolor*, Gray, *Ann. & Mag. N. H.* (4) xi. p. 304 (1873).

*Mesoclemmys gibba*, Gray, *l. c.* p. 305.

Carapace with a vertebral keel, which becomes very indistinct in the adult. Front lobe of plastron not or but slightly broader than hind lobe; intergular shield shorter than its distance from the abdominals; suture between the pectorals shorter than that between the abdominals. Median region of upper surface of head divided into irregular shields; parietal bones above wider than the diameter of the orbit; mental barbels shorter than the diameter of the eye. Uniform dark chestnut-brown above; marginal yellow inferiorly; plastron dark brown, bordered with yellow; head brown above, spotted with black; throat yellowish in the young, spotted with black; barbels uniform yellowish.

Length of shell 18 centim.

Trinidad, Guianas, Brazil.

a. ♂, stffd.

Mt. Tamana, Trinidad.

(Type of *H. gordonii*.)

b. Yg., spir.

Demerara Falls.

(Type of *H. bicolor*.)

c. ♀, stffd.

— ?

d. Yg., spir.

— ?

5. *Hydraspis radiolata*.

*Emys radiolata*, *Mikan, Delect. Faun. Flor. Bras.* pl. — (1820).

*Chelodina radiolata*, *Fitzing. N. Class. Rept.* p. 45 (1826).

*Hydraspis radiolata*, *Gray, Syn. Rept.* p. 41 (1831).

*Platemys gaudichaudii*, *Dum. & Bibr. ii.* p. 427 (1835).

*Hydraspis gaudichaudii*, *Gray, Cat. Tort.* p. 40 (1844), and *Sh. Rept. i.* p. 57 (1855), and *Ann. & Mag. N. H.* (4) xi. p. 304 (1873).

Carapace with a feeble vertebral keel; dorsal shields of half-grown specimens with radiating striae. Front lobe of plastron broader than hind lobe; intergular shield at least as long as its distance from the abdominals; suture between the pectorals shorter than that between the abdominals. Skin of upper surface of head divided into irregular shields; parietal bones above as wide as the diameter of the orbit; mental barbels shorter than the diameter of the eye. Dark brown above; lower surface of marginals yellow; plastron yellow, with a large subrhomboidal dark brown spot in the middle; tympanum, chin, and throat yellowish, with small brown spots. Adult unknown.

Brazil.

*a.* Yg., spir.

Bahia.

6. *Hydraspis rufipes*.

*Emys rufipes*, *Spir., Test. Bras.* p. 7, pl. vi. (1824).

*Rhinemys rufipes*, *Wagl. Syst. Amph.* pl. iii. figs. xliii.-lv. (1830).

*Hydraspis rufipes*, *Gray, Syn. Rept.* p. 41 (1831), and *Sh. Rept. i.* p. 56 (1855).

*Platemys rufipes*, *Dum. & Bibr. ii.* p. 433 (1835).

*Phrynops rufipes*, *Gray, Cat. Tort.* p. 41 (1844).

Carapace with a vertebral keel. Front lobe of plastron broader than hind lobe; intergular shield much shorter than its distance from the abdominals; suture between the pectorals longer than that between the abdominals. Forehead and vertex covered with undivided skin; parietal bones expanded; mental barbels shorter than the diameter of the eye. Brown above, yellowish inferiorly; throat and limbs rufous.

Length of shell 25 centim.

River Solimoëns, Brazil.

7. *Hydraspis wagleri*.

*Platemys wagleri*, *Dum. & Bibr. ii.* p. 422 (1835).

*Hydraspis wagleri*, *Gray, Cat. Tort.* p. 40 (1844), and *Sh. Rept. i.* p. 56 (1855).

Carapace much elongate, much narrowed at both ends, not keeled. Plastron broader in front than behind; suture between the pectoral shields shorter than that between the abdominals. Forehead and vertex covered with undivided skin. Shell rufous above, edged with yellow, yellow inferiorly; upper surface of head and limbs



olive-brown, lower surface yellow, with some black spots under the neck; a black streak under the ear and another behind the barbel.

Length of shell 32 centim.

Brazil.

## 6. PLATEMYS.

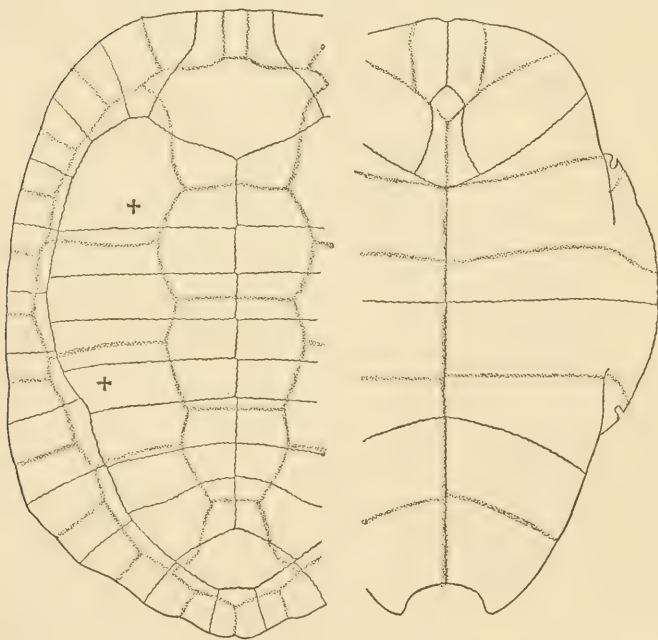
*Hydraspis*, part., *Bell, Zool. Journ.* iii. p. 511 (1828); *Gray, Syn. Rept.* p. 39 (1831), and *Cat. Tort.* p. 38 (1844).

*Platemys*, *Wagler, Syst. Amph.* p. 135 (1830); *Gray, Cat. Sh. Rept.* i. p. 53 (1855), and *Suppl.* p. 75 (1870).

*Platemys*, part., *Dum. & Bibr.* ii. p. 404 (1835); *Strauch, Chelon. Stud.* p. 45 (1862).

*Acanthochelys*, *Gray, Ann. & Mag. N. II.* (4) xi. p. 305 (1873).

Fig. 61.



Shell of *Platemys platycephala*.

Neural plates absent; nuchal shield present, marginal. Plastron large, with moderately strong axillary and inguinal buttresses, the latter ankylosed to the fifth costal plate. Parietal bones broad, expanded above, connected with the strong supraoccipital arch; jaws moderately strong, without alveolar ridges, Chin with a pair of dermal appendages, or barbels. Digits webbed.

South America.

1. *Platemys spixii*.

*Emys depressa* (non *Merr.*), *Spix, Test. Bras.* p. 4, pl. iii. fig. 2 (1824).

*Platemys spixii*, *Dum. & Bibr.* ii. p. 409 (1835); *Strauch, Chelon. Stud.* p. 152 (1862), and *Verth. Schildkr.* p. 114 (1865).

*Hydraspis spixii*, *Gray, Cat. Tort.* p. 39 (1844), and *Sh. Rept.* i. p. 54 (1855).

*Acanthochelys spixii*, *Gray, Ann. & Mag. N. H.* (4) xi. p. 305 (1873).

Carapace grooved along the vertebral line, the shields with concentric and radiating striæ; nuchal shield twice as long as broad; first and fifth vertebrals very large, second, third, and fourth about as long as broad in the adult. Plastron large, four times as long as the width of the bridge, angularly notched behind in the half-grown, very feebly in the adult; proportions of the plastral shields very variable. Skin of upper surface of head divided into numerous small irregular shields; snout extremely short, very feebly projecting; width of the parietal bones above a little more than the diameter of the orbit; mental barbels very small. Upper surface of neck with large, erect, conical, soft tubercles. Limbs moderately webbed, covered with squarish scales; a fringe of enlarged scales along the outer edge of the fore limb; a much developed, compressed, crescentic process on the inner side of the leg, formed by three very large tubercles. Shell dark brown or black above and below; head and limbs uniform olive-brown above, lighter olive inferiorly.

Length of shell 16 centim.

Brazil.

*a.* ♀, stf'd. Brazil.

*b.* Hgr., spir. San Lorenzo, Rio Grande do Sul. Dr. v. Ihering [C].

2. *Platemys platycephala*.

*Testudo platycephala*, *Schneid. Schrift. Berl. Naturf. Fr.* x. p. 259, pl. vii. (1792).

— planiceps, *Schoepff, Test.* p. 115, pl. xxvii. (1792).

— martinella, *Daud. Rept.* iii. p. 344 (1803).

*Emys planiceps*, *Schweigg. Prodr.* p. 34 (1814).

— canaliculata, *Spix, Test. Bras.* p. 10, pl. viii. (1824).

*Platemys canaliculata*, *Wagl. Syst. Amph.* pl. iv. figs. 1-26 (1830).

*Hydraspis planiceps*, *Gray, Syn. Rept.* p. 40 (1831), and *Cat. Tort.* p. 39 (1844).

*Platemys martinella*, *Dum. & Bibr.* ii. p. 407 (1835).

? *Hydraspis spixii*, *Tschudi, Faun. Per., Herp.* p. 22 (1845).

*Platemys planiceps*, *Gray, Cat. Sh. Rept.* i. p. 54 (1855), and *Suppl.* p. 75 (1870); *Strauch, Verth. Schildkr.* p. 114 (1865).

Carapace very much depressed, deeply grooved along the vertebral region, on each side of which is an obtuse longitudinal keel; shields feebly striated concentrically in the adult; nuchal narrow; fourth and fifth vertebrals small. Plastron large, its length about thrice and a half the width of the bridge; axillary and inguinal shields

small; posterior notch of plastron feeble. Head much flattened, covered with undivided skin above; snout strongly projecting; parietal bones much expanded, their width much greater than the diameter of the orbit; mental barbels very small. Upper surface of neck with round or conical tubercles, those on the sides largest and erect. Limbs shortly webbed, covered with large scales, those on the upper arm and thigh being the largest; a much developed, compressed, crescentic process on the inner side of the leg, formed by two or three very large tubercles. Carapace chestnut-brown above, with a large black blotch on each side on the costals; marginals yellow inferiorly, with triangular black spots; plastron blackish brown, bordered with yellow; a blackish-brown band on the bridge; head yellowish above, dark brown or black on the sides and below.

Length of shell 15 centim.

Guianas, Brazil, North-eastern Peru.

|                           |                                           |                         |
|---------------------------|-------------------------------------------|-------------------------|
| <i>a.</i> ♀, spir.        | British Guiana.                           | Sir R. Schomburgk [P.]. |
| <i>b.</i> ♀, spir.        | Demerara Falls.                           |                         |
| <i>c, d.</i> ♂ ♀, shells. | Demerara.                                 |                         |
| <i>e.</i> Hgr., spir.     | Surinam.                                  |                         |
| <i>f.</i> ♀, spir.        | Guiana.                                   |                         |
| <i>g.</i> ♂, stfid.       | Rio Negro, Brazil.                        | H. W. Bates, Esq. [C.]. |
| <i>h.</i> ♀, dry.         | Santa Cruz, Huallaga<br>River, N.E. Peru. |                         |
| <i>i.</i> Hgr., skel.     | — ?                                       |                         |

## 7. EMYDURA.

*Hydraspis*, part., *Gray, Syn. Rept.* p. 39 (1831).

*Platemys*, part., *Dum. & Bibr.* ii. p. 404 (1835); *Strauch, Chelon. Stud.* p. 45 (1862).

*Emydura*, *Bonap. Arch. f. Nat.* 1838, i. p. 140.

*Chelymys*, *Gray, Cat. Tort.* p. 42 (1844), and *Sh. Rept.* i. p. 57 (1855), and *Suppl.* p. 75 (1870), and *App.* p. 20 (1872).

*Elseya*, part., *Gray, Ann. & Mag. N. H.* (4) xx. p. 44 (1867), and *Suppl. Cat. Sh. Rept.* i. p. 76, and *App.* p. 22.

*Euchelymys*, *Gray, Ann. & Mag. N. H.* (5) viii. p. 118 (1871), and *App.* p. 21.

Neural plates absent; nuchal shield present or absent. Plastron large, with very strong axillary and short inguinal buttresses, the latter reaching the fifth or between the fifth and sixth costal plates. A supraoccipital arch; parietal bones much expanded, forming a roof; jaws very strong, without alveolar ridges; the width of the lower jaw at the symphysis equals at least the diameter of the orbit. Chin with or without dermal appendages. Digits entirely webbed.

Australia and New Guinea.

The species of this and the following genus differ from all other Chelydidae in not having the first vertebral shield larger than the second. The limbs are similar to those of *Hydraspis*.

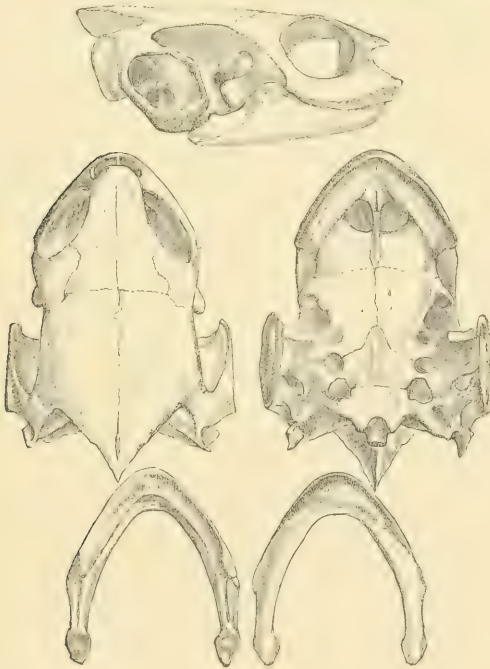
*Synopsis of the Species.*

I. Upper surface of neck with small rounded tubercles; nuchal shield present; mental barbels absent or very small.

A. The width of the bridge is less than one third the length of the plastron.

- Barbels present; a yellow lateral band from the angle of the mouth to the neck ..... 1. *macquariei*, p. 230.  
 No trace of barbels; plastron truncate or broadly rounded anteriorly; a yellow band from the eye to the ear .... 2. *krefftii*, p. 231.

Fig. 62.

Skull of *Emydura macquariei*. (From Gray, P. Z. S. 1872.)

No trace of barbels; plastron obtusely acuminate anteriorly; a yellow band from the end of the snout to the ear. . 3. *albertisii*, p. 232.

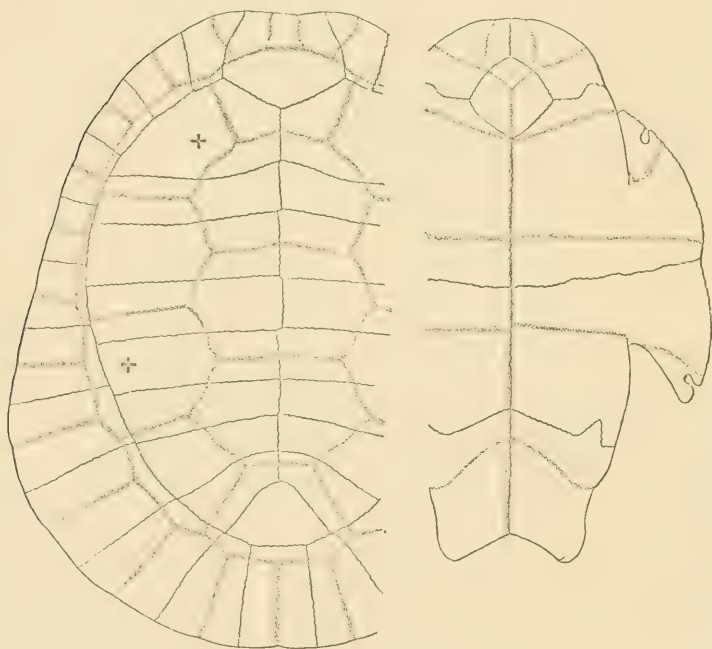
B. The width of the bridge measures at least one third the length of the plastron.

Barbels present ..... 4. *subglobosa*, p. 232.  
 Barbels absent ..... 5. *australis*, p. 232.

II. Upper surface of neck with conical erect tubercles; barbels well developed, conical.

Nuchal usually absent; intergular shield larger than the gulars ..... 6. *latisternum*, p. 233.  
 Nuchal present; intergular very narrow, smaller than the gulars..... 7. *novæ-guinæe*, p. 233.

Fig. 63.



Shell of *Emydura macquariae*.

### 1. *Emydura macquariae*.

*Hydraspis macquarrii*, Gray, *Syn. Rept.* p. 40 (1831).  
*Platemys macquaria*, Dum. & Bibr. ii. p. 438 (1835).  
*Hydraspis victoriæ*, Gray, *Zool. Misc.* p. 55 (1842).  
*Chelymys macquaria*, part., Gray, *Cat. Tort.* p. 42 (1844), and *Sh. Rept.* i. p. 57 (1855).



*Euchelymys sulcifera*, Gray, *Ann. & Mag. N. H.* (4) viii. p. 118 (1871), and *App. Cat. Sh. Rept.* p. 22 (1872), and *Proc. Zool. Soc.* 1872, p. 508.

*Chelymys victoriæ*, part., Gray, *App.* p. 21, and *Proc. Zool. Soc.* 1872, p. 506, pl. xxvii.

— *macquaria*, McCoy, *Prodr. Zool. Vict.* pls. lxxxii. and lxxxiii. (1884).

Shell more or less depressed, its depth contained twice and a half to three times in its length; posterior margin strongly expanded, not or but very feebly serrated; nuchal shield well developed; carapace with longitudinal or sinuous rugosities or with vermicular impressions; a more or less distinct linear vertebral groove. Plastron more than thrice as long as the width of the bridge, subtruncate or rounded anteriorly, notched posteriorly; intergular shield not twice as long as broad, larger than the gulars. A pair of small mental tubercles or barbels; upper surface of neck with round warts. Carapace olive or olive-brown, plastron pale olive; soft parts olive or brownish; a yellowish band from the angle of the mouth to the neck, passing below the ear.

Length of shell 27 centim.

South-eastern Australia; North-western Australia?

|                           |                                 |                                                            |
|---------------------------|---------------------------------|------------------------------------------------------------|
| <i>a-b.</i> ♀, spir.      | Adelaide.                       |                                                            |
| <i>c.</i> ♀, skel.        | Adelaide.                       |                                                            |
| <i>d.</i> ♀, stffid.      | S. Australia.                   | Sir J. Mitchell [P.].                                      |
| <i>e.</i> ♀, stffid.      | S. Australia.                   | J. Gould, Esq. [P.].                                       |
| <i>f.</i> Ad., shell.     | S. Australia.                   |                                                            |
| <i>g, h.</i> Ad., shells. | Victoria River, N.W. Australia. | Capt. W. Chambers [P.].<br>(Types of <i>C. victoriæ</i> .) |
| <i>i.</i> ♀, stffid.      | Australia. }                    | (Types of <i>E. sulcifera</i> .)                           |
| <i>k, l.</i> Ad., shells. | Australia. }                    |                                                            |
| <i>m.</i> Yg., shell.     | Australia.                      |                                                            |
| <i>n.</i> Hgr., skull.    | Australia.                      |                                                            |

## 2. *Emydura krefftii*.

*Chelymys krefftii*, Gray, *Ann. & Mag. N. H.* (5) viii. p. 366 (1871), and *App. Cat. Sh. Rept.* p. 21 (1872), and *Proc. Zool. Soc.* 1872, p. 506, pl. xxviii.

— *victoriæ*, part., Gray, *App.* p. 21, and *Proc. Zool. Soc.* 1872, p. 506, fig. 2.

Closely allied to the preceding, but carapace less expanded posteriorly, more oval; depth of the shell contained twice and two fifths to three times in the length. No trace of barbels. Coloration as in the preceding, but with a yellow band extending from the eye to the ear.

Length of shell 25 centim.

Queensland.

|                                |                |                                  |
|--------------------------------|----------------|----------------------------------|
| <i>a.</i> ♀, stffid.           | Burnett River. | G. Krefft, Esq. [P.].<br>(Type.) |
| <i>b.</i> ♂, stffid.           | Burnett River. | G. Krefft, Esq. [P.].            |
| <i>c, d-e.</i> ♂ & hgr., spir. | Burnett River. | G. Krefft, Esq. [P.].            |
| <i>f.</i> Yg., spir.           | Gayndah.       | Museum Godeffroy.                |

3. *Emydura albertisii*.

*Emydura albertisii*, *Bouleng. Ann. Mus. Genova*, (2) vi. p. 449 (1888).

Carapace oval, obtusely keeled in the male, convex and very rugose in the female; the depth of the shell contained twice and a half in its length. Front lobe of plastron obtusely acuminate. No trace of barbels. Otherwise as in *E. macquarie* and *krefftii*. Carapace blackish brown, plastron bright yellow; an olive band on the bridge bordered on each side by a more or less distinct festooned brown band; soft parts dark brown; a bright yellow band from the nostrils to above the ear, passing on the upper eyelid; a yellow band on the upper jaw and another on the lower.

Length of shell 16 centim.

S.E. New Guinea.

4. *Emydura subglobosa*.

*Euchelymys subglobosa*, *Kreffft, Ann. Mus. Genova*, viii. p. 390 (1876); *Peters & Doria, Ann. Mus. Genova*, xiii. p. 328 (1878).

*Emydura subglobosa*, *Bouleng. Ann. Mus. Genova*, (2) vi. p. 450 (1888).

Shell very convex, a little more than twice as long as deep, oval, rugose, with a linear vertebral groove; nuchal well developed. Plastron three times as long as the width of the bridge, front lobe broadly truncate anteriorly; intergular shield large, a little longer than broad, much larger than the gulars. A pair of small barbels. Brown above, yellow inferiorly; soft parts brown; a yellow band from the end of the snout to above the ear, passing through the eye; a yellow band on the upper jaw and another on the lower.

Length of shell 22 centim.

S.E. New Guinea.

5. *Emydura australis*.

*Hydraspis australis*, *Gray, in Grey, Trav. Austr.* ii. p. 445, pl. vi. (1841).

*Chelymys macquaria*, part., *Gray, Cat. Tort.* p. 42 (1844), and *Sh. Rept.* i. p. 57 (1855).

— *macquaria*, *Gray, App. Cat. Sh. Rept.* p. 20 (1872).

Shell convex, tectiform, twice and one third as long as deep, expanded posteriorly; nuchal well developed. Plastron not three times as long as the width of the bridge, front lobe rounded; intergular shield not twice as long as broad, larger than the gulars. No barbels; lower jaw very strong, its diameter at the symphysis considerably greater than the diameter of the orbit. Dark brown above, yellowish inferiorly.

Length of shell 14 centim.

*a.* ♀, stfid.

W. Australia?

J. Gould, Esq. [P.]. (Type.)

6. *Emydura latisternum*.

*Elseya latisternum*, Gray, *Ann. & Mag. N. H.* (4) xx. p. 44 (1867),  
and *Suppl. Cat. Sh. Rept.* i. p. 77 (1870), and *App.* p. 22 (1872), and  
*Proc. Zool. Soc.* 1872, p. 511, pl. xxix.

*Euchelymys spinosa*, Gray, *Ann. & Mag. N. H.* (5) viii. p. 118  
(1871).

*Elseya spinosa*, Gray, *App.* p. 23.

Carapace very much depressed, keeled in the young, with a more or less distinct vertebral groove in the adult; posterior margin more or less strongly serrated; nuchal shield normally absent; dorsal shields slightly rugose. Plastron moderately large, front lobe rounded, hind lobe angularly notched; the width of the bridge is contained three and a half to four times in the length of the plastron; intergular shield much larger than the gulars, once and two thirds to twice as long as broad; suture between the anals much longer than that between the abdominals. Head large, with the skin closely adhering to the skull; snout very prominent; interorbital space concave in the adult; chin with a pair of well-developed conical dermal appendages; upper surface of neck with large, erect, conical tubercles. Brown above; lower surface of shell yellow or brownish; a whitish band may be present along each side of the neck.

Length of shell 24 centim.

Queensland.

|                         |                |                               |
|-------------------------|----------------|-------------------------------|
| <i>a-b.</i> Hgr., spir. | Cape York.     | Museum Godeffroy.             |
| <i>c.</i> ♂, spir.      | Gayndah.       | Museum Godeffroy.             |
| <i>d.</i> Hgr., stffld. | Burnett River. | G. Krefft, Esq. [P.].         |
| <i>e.</i> Hgr., spir.   | Burnett River. | G. Krefft, Esq. [P.].         |
| <i>f.</i> ♀, stffld.    | Queensland.    | G. Krefft, Esq. [P.].         |
| <i>g.</i> ♀, stffld.    | Australia.     | (Type.)                       |
| <i>h.</i> ♂, spir.      | Australia.     | G. Krefft, Esq. [P.].         |
|                         |                | (Type of <i>E. spinosa</i> .) |
| <i>i.</i> Yg., skel.    | Australia.     |                               |

7. *Emydura novæ-guinææ*.

*Platemys novæ-guinææ*, Meyer, *Mon. Berl. Ac.* 1874, p. 128.

*Emydura novæ-guinææ*, Bouleng. *Ann. Mus. Genova*, (2) vi. p. 450  
(1888).

Closely allied to the preceding, but nuchal shield well developed and plastron smaller, with narrower front lobe; the width of the bridge is contained thrice and one fourth in the length of the plastron; intergular shield very narrow, thrice as long as broad, much smaller than the gulars. Shell and soft parts brown above and yellowish inferiorly; a small blackish spot on each vertebral and costal shield.

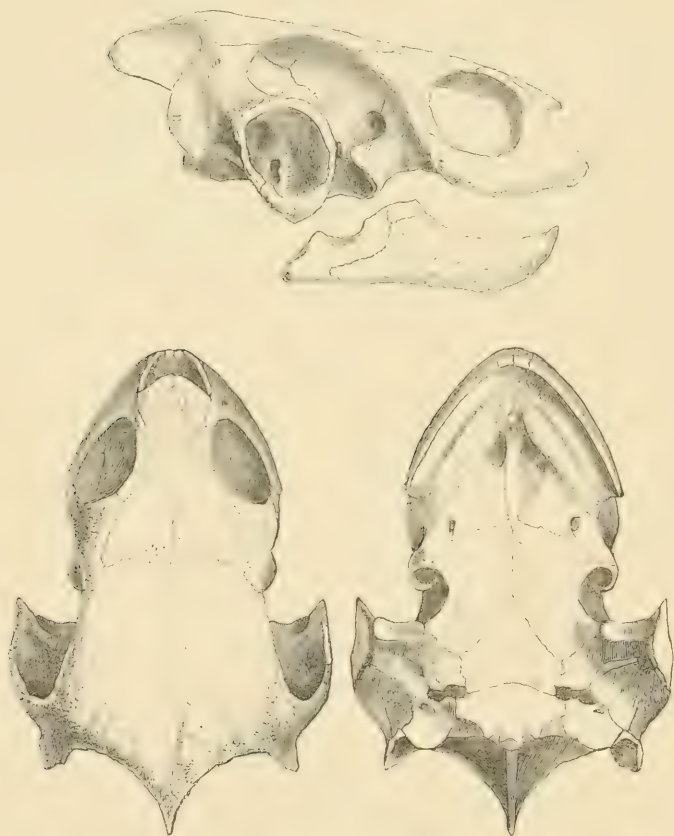
New Guinea.

## 8. ELSEYA.

Elseya, part., *Gray, Ann. & Mag. N. H.* (4) xx. p. 43 (1867), and *Suppl. Cat. Sh. Rept.* i. p. 76 (1870), and *App.* p. 22 (1872).

Neural plates absent; nuchal shield absent. Plastron large, with very strong axillary and short inguinal buttresses, the latter just reaching the fifth costal plate. A supraoccipital arch; parietal

Fig. 64.

Skull of *Elseyia dentata*.

bones much expanded, forming a roof; jaws very strong; a median ridge along the alveolar surface of the upper jaw. Chin with a pair of dermal appendages. Digits entirely webbed.

Australia.

1. *Elseya dentata*.

*Chelymys dentata*, Gray, *Ann. & Mag. N. H.* (4) xii. pp. 98 & 246 (1863).

*Podocnemis* ? *dentata*, *Strauch, Verth. Schildkr.* p. 104 (1865).

*Elseya dentata*, Gray, *Ann. & Mag. N. H.* (4) xx. p. 44 (1867), and *Suppl.* p. 76 (1870), and *App.* p. 23 (1872), and *Proc. Zool. Soc.* 1872, p. 513, fig. 5.

— *intermedia*, Gray, *App.* p. 23, and *Proc. Zool. Soc.* 1872, p. 512.

Carapace more or less depressed, keeled in the young; posterior margin strongly serrated in the young, feebly in the adult; shields nearly smooth. Plastron large, front lobe rounded or subacuminate, hind lobe strongly notched; the width of the bridge is contained twice and two thirds to thrice in the length of the plastron; intergular shield narrow, more than twice as long as broad. Head rather large, with the skin closely adhering to the skull; snout prominent; a pair of well-developed barbels; the width of the lower jaw at the symphysis equals the diameter of the orbit; upper surface of neck with small tubercles. Limbs very broadly webbed, strongly fringed on the outer side; anterior surface of fore limb with several transverse lamellæ. Carapace dark brown above, yellowish or brown inferiorly; soft parts olive.

Length of shell 27 centim.

North Australia.

- |                                  |                                       |                                  |
|----------------------------------|---------------------------------------|----------------------------------|
| <i>a, b.</i> Hgr. & yg., shells. | Upper Victoria River, N.W. Australia. | J. R. Elsey, Esq. [P.] (Types.)  |
| <i>c.</i> ♀, shell.              | Upper Victoria River, N.W. Australia. | (Type of <i>E. intermedia</i> .) |
| <i>d, e.</i> ♂ & hgr., spir.     | Gayndah.                              | Museum Godeffroy.                |
| <i>f.</i> Ad., skel.             | Gayndah.                              | Museum Godeffroy.                |



Fam. 10. **CARETTOCHELYDIDÆ.**

Carettochelydidæ, *Boulenger, Ann. & Mag. H. H.* (5) xix. 1887, p. 171.

Shell without epidermal shields. Plastron composed of nine bones. Limbs paddle-shaped; digits much elongate, only the two inner clawed. Neck not retractile.

A single genus and species, which is still very imperfectly known.

**1. CARETTOCHELYS.**

Carettochelys, *Ramsay, Proc. Linn. Soc. N. S. W.* (2) i. p. 158 (1886).

Six neural plates, all separated from one another by the costals, which meet on the median line.

New Guinea.

**1. Carettochelys insculpta.**

Carettochelys insculptus, *Ramsay, l. c.* pls. iii.-vi.

Carapace subcordiform, elevated and rounded in front, laterally flattened behind and strongly keeled, the sides shelving, with the marginal plates expanding, densely rugose. 21 marginals (including the pygo-marginal). The whole of the plates of the carapace and plastron are covered with small round raised rugations or wavy irregular raised lines between shallow sculptures; towards the lower borders on the sides these take an elongated form sometimes parallel to the sutures. Head large; lower jaw strong; head with five to seven shields, anterior and median pairs coalesced. Anterior margin of fore legs covered with from seven to ten narrow, band-like, unequal shields. Tail short, with from fourteen to sixteen narrow curved shields on the upper surface.

Length of shell 46 centim.

Fly River.

## Superfam. C. TRIONYCHOIDEA.

- Amydæ, part., *Oppel, Ordn. Rept.* 1811.  
 Trionyochoidea, *Stannius, Zoot. Amph.* 1854.  
 Amydæ, part., *Agassiz, Contr. Nat. Hist. U. S.* i. 1857.  
 Trionyochoidea, *Gray, Suppl. Cat. Sh. Rept.* i. 1870.  
 Cryptodira, part., *Cope, Proc. Amer. Assoc. Adv. Sc.* xix. 1870, p. 235.  
 Peltochelyidæ, *Seeley, Q. Journ. Geol. Soc.* xxxvi. 1880, p. 412.  
 Dactylosterna, part., *Cope, Proc. Amer. Philos. Soc.* xx. 1882, p. 143.  
 Dactyloplastra, part., *Dollo, Bull. Mus. Belg.* iv. 1886, p. 91.  
 Diacostoidea, *Baur, Zool. Anz.* 1887, p. 99.

Neck bending by a sigmoid curve in a vertical plane; cervical vertebræ without well-developed transverse processes; articulation between the last cervical and the first dorsal vertebra by the zygapophyses only. Mandible with articular concavities; outer border of tympanic cavity notched; pterygoids not narrowed posteriorly, separated from each other, the basisphenoid joining the palatines. Pelvis not anchylosed to the carapace and plastron. Fourth digit with four or more phalanges. Epiplastra separated from the hyoplastra by the  $\Lambda$ -shaped entoplastron. Marginal bones absent or forming an incomplete series, not connected with the ribs.

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DORSAL VERTEBRAL COLUMN AND CARAPACE.—As in the Cryptodira, the dorsal vertebral column consists of ten vertebræ, the first and last of which are free from the carapace and have small or vestigial free ribs; the centra are flattened, with a more or less distinct ventral keel. The first dorsal vertebra articulates with the last cervical merely by its præzygapophyses. Eight ribs contribute to the formation of the dorsal disk, but in the American species of *Trionyx*, which have but seven costal plates, the last remains free; the vertebral attachment of all except the latter is between two centra. All the dorsal plates are sculptured, pitted, vermiculate, or granulate. The neurals, the greater part of which are six-sided, with the postero-lateral side the shortest, number generally seven or eight; but they are much reduced in number and in size in *Cyclanorbis*, in which, as in some Pleurodira, the costal plates meet on the median line between them. Except in some *Trionyx*, the last or last two pair of costals join in a median suture. The nuchal is much broader than long and, in *Trionyx*, *Pelochelys*, and *Chitra*, each end overlaps the extremity of the rib of the second vertebra. In *Emyda*, *Cyclanorbis*, and *Cycloderma*, on the contrary, the outer extremities of the nuchal bone are overlapped by the first costal plate. Pygals are absent, and likewise marginals connected with the ribs. But, in *Emyda*, the posterior fleshy border of the dorsal disk contains a series of sculptured bones which appear to form the continuation of the lateral plastral plates; these bones are not

to be looked upon as vestiges of the marginals of other Chelonians, but have evidently an independent origin, like another similar ossification, anterior to the nuchal, which is found in *Emyda* and *Cyclanorbis*.

**PLASTRON.**—The plastron forms, as in the Marine Turtles and the young of all Chelonians, an incomplete shield, a median vacuity being present throughout life between the lateral elements. These, the hyo- and hypoplastra, are joined by suture, or may even (in *Cycloderma*, *Emyda*, and *Cyclanorbis*) be fused into a single bone as early as birth, although distinct in the embryo\*; but their inner and outer borders form deep dentations, and there is no connection with the dorsal shield. The xiphiplastra join each other and the hypoplastra by interlocked digitations. The three other elements, viz. the epiplastra (clavicles) and the entoplastron (interclavicle), differ greatly from their homologues in other Chelonians, each of these being angular or chevron-shaped, the three forming together a **Λ**- or **X**-shaped figure; the posterior branch of each epiplastron is in contact with the entoplastron, and separated by the extremity of the latter from the hyoplastron. Some or all of the plastral bones develop with age superficial rugose or sculptured plates, the so-called plastral callosities, which may extend considerably beyond the limits of, and differ greatly in shape from, the original bones. In *Trionyx* these plates are constantly present on the hyo-hypoplastra, usually on the xiphiplastra, and more rarely, and as a rule only in fully adult specimens, on the entoplastron; in *Cycloderma*, *Emyda*, and *Cyclanorbis*, each bone has its sculptured plate, and in the latter genus there are a pair of additional similar plates in front of the epiplastra and often other, smaller, independent ossifications as well.

**CERVICAL VERTEBRÆ.**—In these essentially "Cryptodiran" Turtles the neck is more perfectly adapted for complete and rapid retraction than in any other Chelonian†. The cervical region at least equals, and usually exceeds, the length of the dorsal vertebral column. The most remarkable peculiarity resides in the structure of the last or eighth vertebra, the centrum of which terminates in a thin plate and does not articulate with the first dorsal; the articulation being merely by means of the zygapophyses, in such a way that the two vertebrae form together an angle when the neck is stretched out, and are applied closely by their lower surfaces when the neck is retracted.

The four elements of the atlas are distinct, viz. the neural arches, the hypapophysis (pseudocentrum), and the centrum (odontoid process). The following vertebrae are much elongate, compressed in the middle, and transverse processes are absent, or merely represented on the

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\* Anderson has found the hyoplastron formed of two bones, an outer and an inner, in an embryo of *Emyda scutata*. J. Linn. Soc. xii. 1876, p. 514.

† Anderson (Anat. Zool. Res. Yunnan, p. 785) remarks that the neck when retracted is so doubled on itself, that the base of the cervical vertebrae, at the anterior extremity of the carapace, is on the same line with the tip of the snout, and the posterior bend opposite the inguinal notch of the plastron.

anterior vertebræ by a small tubercle below the præzygapophyses. The neuro-central suture is persistent. All the vertebræ except the first and eighth are opisthocœlous, and the articulation is ginglymoid between the seventh and eighth.

**SACRAL AND CAUDAL VERTEBRÆ.**—The sacral vertebræ are two in number, with very strong ribs suturally united together distally. As a rule, the sacral ribs articulate with the neural arch only; *Pelochelys* forms, however, an exception, the ribs articulating with both arch and centrum, as in other Chelonians. The caudal vertebræ are procœlous, with strong transverse processes which, in the anterior vertebræ, are entirely upon the neural arch. The neuro-central suture persists on the anterior vertebræ. They range in number from 14 to 19. Chevron bones are absent.

**SKULL.**—The skull, which is much depressed, is remarkable for the great development of three crest-like posterior processes, directed backwards and upwards, viz. the supraoccipital and, on each side, the squamosal. The orbits are moderate or small, turned obliquely upwards, and in some forms (especially *Chitra*) close to the anterior extremity of the skull; they are bordered by the maxillary, the præfrontal, the frontal, the postfrontal, and the jugal. The præmaxillary is extremely small, single, not entering the nasal opening, and widely separated from the vomer, the maxillaries uniting in a median suture in front of the choanæ. The præfrontals are large and in contact throughout, and constantly separated from the postfrontals by the frontals; the postfrontals are comparatively small, and the parietals join the jugals, the two latter bones forming a suture on the upper surface of the skull in such forms as have a broad post-orbital arch. The parietals, which have large descending palatal processes, never expand into a supratemporal roof. A zygomatic or temporal arch is present, but constantly rather slender, and formed by the jugal and the quadratojugal; the latter bone is small, and in *Chitra* and *Pelochelys* separates the jugal from the squamosal. There is no parieto-squamosal arch. The quadrate surrounds the outer ear-chamber, which is completely closed, with the exception of a small foramen for the passage of the stapes; the tympanic border is formed by the squamosal above, and a rather shallow notch is present in the quadrate posteriorly. Two very distinct articular facets are present on the quadrate, corresponding with the concavities of the mandible.

The structure of the palate is very characteristic. The vomer is small, separates the choanæ, and is usually connected by ascending processes with the præfrontals. The palatines are large and form a median suture; they are posteriorly in extensive contact with the basisphenoid, which is more developed than in any other Thecophore, and widely separates the pterygoids. The latter bones are broad, with straight or convex outer borders forming more or less distinct wings; they are devoid of lateral processes, and extend posteriorly beyond the quadrate, which they separate from the basioccipital.

In *Trionyx* and *Emyda* the opisthotic is produced posteriorly into a crest applied against the squamosal process.

The *foramen magnum* is deeper than broad and bordered by the basioccipital, the exoccipitals, and the supraoccipital.

The lower jaw resembles that of the Cryptodira in the number of distinct elements, but differs from these as well as all other Chelonians in the great development of the coronoid process and the presence of a strong posterior process formed by the angular, the supra-angular, and the articular.

**HYOID ARCH.**—The hyoid apparatus is larger in proportion than in any other Chelonian. The body, which is concave, is formed of three pairs of bones in most genera, of four in *Chitra* and *Pelochelys*. Two pairs of large bony cornua are present, the hinder attached to the last pair of copulae, and terminating in a series of from two to five additional ossifications. The entoglossal is a rhomboidal cartilage.

**PECTORAL ARCH AND FORE LIMB.**—The coracoid is longer than either the procoracoid or the scapula, more or less dilated, and with convexly curved outer border. The humerus is strongly curved, as in the Chelydridæ and Testudinidæ; the forearm, on the other hand, resembles more that of the Chelonidæ, the radius being considerably longer than the ulna and placed partly below the latter. The nine carpal bones are distinct, and there is, in addition, a moderately large pisiform. The metacarpal and phalanges are very stout in the first finger, and decrease gradually in strength and increase in length to the fourth, which is the longest. The phalanges number 2.3.3.4.3 in *Trionyx* generally and in *Pelochelys*; 2.3.3.5.4 in *Trionyx triunguis*, *Cycloderma*, *Emyda*, and *Cyclanorbis*; 2.3.3.6.4 in *Chitra*.

**PELVIS AND HIND LIMB.**—The pelvis resembles that of the Chelydridæ, enclosing a large undivided foramen between the pubes and ischia, but differs in the considerably larger pubes, the inner and especially the outer process of which expand into very broad wings. The ilia are attached to the sacral ribs.

The tarsus contains six bones (including that which is regarded by many anatomists as the fifth metatarsal), viz. one in the proximal row, in contact with the tibia and the fibula, and five in the distal. The phalanges number 2.3.3.4.2 in *Trionyx*, *Pelochelys*, *Emyda*, and *Cyclanorbis*; 2.3.3.4.3 in *Cycloderma*; and 2.3.3.5.3 in *Chitra*.



## Fam. 11. TRIONYCHIDÆ.

- Trionycidæ, *Gray, Ann. Phil.* (2) x. 1825.  
 Trionychidæ, *Bell, Zool. Journ.* iii. 1828.  
 Steganopodes, part., *Wagler, Syst. Amph.* 1830.  
 Trionycidæ, *Gray, Syn. Rept.* 1831.  
 Potamites, *Duméril & Bibron, Erp. Gén.* ii. 1835.  
 Trionycidæ, *Gray, Cat. Tort.* 1844, and *Sh. Rept.* i. 1855.  
 Trionychidæ, *Agassiz, Contr. N. H. U. S.* i. 1857.  
 Trionychida, *Strauch, Chelon. Stud.* 1862.  
 Chitradæ, Trionychidæ, Emydinadæ, *Gray, Suppl. Cat. Sh. Rept.* i. 1870.  
 Trionychidæ, *Cope, Proc. Amer. Philos. Soc.* xx. 1882, p. 143.

Carapace and plastron without epidermal shields. Jaws concealed under fleshy lips; snout ending in a proboscis. Head and neck completely retractile. Ear hidden. Only the three inner digits clawed.

Rivers of Asia, Africa, and North America.

*Synopsis of the Genera.*

- I. Plastron without cutaneous valves; hyoplastron distinct from hypoplastron; outer extremities of the nuchal bone overlying the second dorsal rib; posterior border of the pterygoids free, without median process; walls of the labyrinth completely exposed behind.

Orbit nearer the temporal than the nasal fossa; bony choanæ between the orbits \* ..... 1. *Trionyx*, p. 242.

Orbit nearer the nasal than the temporal fossa; bony choanæ between the orbits ..... 2. *Pelochelys*, p. 262.

Orbit much nearer the nasal than the temporal fossa; bony choanæ behind the orbits ..... 3. *Chitra*, p. 263.

- II. Plastron with a cutaneous femoral valve, under which the hind limb may be concealed; hyoplastron coossified with hypoplastron; outer extremities of the nuchal bone underlying the first costal plate; posterior border of pterygoids with a median ascending process forming a suture with the opisthotic, behind the labyrinth.

Neural plates forming a complete series; no marginal bones.

4. *Cycloderma*, p. 265.

Neural plates forming a complete series; marginal bones present.

5. *Emyda*, p. 267.

Neural plates forming an incomplete, interrupted series; no marginal bones ..... 6. *Cyclanorbis*, p. 270.

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\* The nasal ducts themselves are, in all Trionychoids, produced posteriorly beyond the level of the orbits.

## 1. TRIONYX.

- Emys, part., *Dumér. Zool. Anal.* p. 76 (1806).  
 Trionyx, part., *Geoffr. Ann. Mus.* xiv. p. 1 (1809); *Fitzing. N. Class. Rept.* p. 7 (1826); *Gray, Syn. Rept.* p. 45 (1831); *Strauch, Chelon. Stud.* p. 50 (1862).  
 Aspidonectes, *Wagler, Syst. Amph.* p. 134 (1830); *Agassiz, Contr. N. H. U. S.* i. p. 403 (1857).  
 Gymnopus, part., *Dum. & Bibr.* ii. p. 472 (1835).  
 Platypeltis, *Fitzing. Ann. Wien. Mus.* i. p. 127 (1835); *Agassiz, l. c.* p. 400; *Gray, Suppl. Cat. Sh. Rept.* i. p. 107 (1870), and *Proc. Zool. Soc.* 1873, p. 58.  
 Pelodiscus, *Fitzing. l. c.*  
 Amyda, *Fitzing. l. c.*; *Agassiz, l. c.* p. 398; *Gray, ll. cc.* pp. 95, 62.  
 Tyrse, *Gray, Cat. Tort.* p. 47 (1844), and *ll. cc.* pp. 107, 62.  
 Trionyx, *Gray, Cat. Tort.* p. 49, and *Sh. Rept.* i. p. 64 (1855); *Günth. Rept. Brit. Ind.* p. 46 (1864); *Gray, Suppl. Cat. Sh. Rept.* i. p. 97, and *Proc. Zool. Soc.* 1873, p. 47.  
 Dogania, *Gray, ll. cc.* pp. 49, 69, 105, 56.  
 Rafetus, *Gray, Proc. Zool. Soc.* 1864, p. 81, and *Suppl. Cat. Sh. Rept.* i. p. 103, and *Proc. Zool. Soc.* 1873, p. 64.  
 Aspilus, *Gray, ll. cc.* pp. 83, 101, 65.  
 Potamochelys, part., *Gray, Proc. Zool. Soc.* 1864, p. 85, and *Suppl. Cat. Sh. Rept.* i. p. 104.  
 Landemania, *Gray, Proc. Zool. Soc.* 1869, p. 215, and *Suppl. Cat. Sh. Rept.* i. p. 96, and *Proc. Zool. Soc.* 1873, p. 53.  
 Fordia, *Gray, ll. cc.* pp. 219, 96, 43.  
 Callinia, *Gray, ll. cc.* pp. 221, 108, 60.  
 Sarbieria, *Gray, Proc. Zool. Soc.* 1869, p. 220, and *Suppl.* p. 100.  
 Nilssonina, *Gray, Ann. & Mag. N. H.* (4) x. p. 332 (1872), and *Proc. Zool. Soc.* 1873, p. 45.  
 Isola, *Gray, Proc. Zool. Soc.* 1873, p. 51.  
 Ida, *Gray, l. c.* p. 55.  
 Oscarina, *Gray, Ann. & Mag. N. H.* (4) xii. p. 157 (1873).  
 Yuen, *Heude, Mém. Hist. Nat. Emp. Chîn.* i. p. 18 (1880).  
 Psilognathus, *Heude, l. c.* p. 24.  
 Temnognathus, *Heude, l. c.* p. 25.  
 Gomphopelta, *Heude, l. c.* p. 27.  
 Cœlognathus, *Heude, l. c.* p. 29.  
 Tortisternum, *Heude, l. c.* p. 31.  
 Ceramopelta, *Heude, l. c.* p. 33.  
 Coptopelta, *Heude, l. c.* p. 34.  
 Cinctisternum, *Heude, l. c.* p. 36.

Outer extremities of the nuchal plate overlying the second dorsal rib; neural plates well developed. Limbs completely exposed. Hyoplastron distinct from hypoplastron; not more than five palstral callosities. Bony choanæ between the orbits; jaws strong; post-orbital arch narrower than the diameter of the orbit; pterygoids, posterior border free, without ascending process.

Africa, Asia, North America.

The fact that the width and shape of the alveolar surfaces of the jaws may vary considerably in Turtles of this genus which, in all other respects, must be regarded as closely related or even identical, was first pointed out by Agassiz, who seized upon the

character as one of generic importance; a view in which he was followed by Gray and more lately by Heude. As examples of two extreme forms of jaws, the figures given by Gray of *Tyrse nilotica* and *Fordia africana* (P. Z. S. 1873) may be consulted. It is, however, to be noticed that none of these authors appear to have met with young specimens in which the "molar" character of the alveolar surfaces was developed, all young specimens having sharp-edged jaws. Heude is precise in his statement to that effect; Gray, on the contrary, believes that the difference of form and structure above mentioned is permanent, and found in young as well as old specimens (Suppl. Cat. Sh. Rept. i. p. 87); but the fact that I have been unable to find, in the British Museum collection, a single young specimen with the molar-like alveolar surfaces convinces me that his remarks could not have applied to specimens with the latter type of jaws.

Having myself found in three species, viz. *T. triunguis* (Africa), *T. cartilagineus* (E. Indies), and *T. sinensis* (China), examples of the two types, *i. e.* on the one hand sharp-edged, comparatively narrow jaws, and on the other hand broad crushing alveolar surfaces nearly meeting on the median line in front of the choanæ, in specimens which, in other respects, are undistinguishable, I have arrived at the conclusion that we may be in presence of a case of dimorphism caused by a difference of diet, a view which has been strengthened by a perusal of Heude's notes on the habits of the Chinese Trionychoids.

I fancy that individuals of the same species may, according to circumstances, take to two distinct modes of feeding: the carnivorous, chiefly ichthyophagous, for which the retention of the sharp beak, with which all young Trionychoids are provided, is necessary; and the conchifragous, by which the jaws gradually acquire a great increase of width and strength, accompanied by the loss of the sharp edge. When once a certain amount of specialization in the latter direction has been reached, hunting for active prey becomes more and more difficult, and the character hence more and more developed as the animal grows older and takes to crushing harder and harder objects, such as large shells and hard seeds, as Heude has actually observed. Accompanying the more massive mandible, a second character makes its appearance, viz. the presence of a tubercle on the lower border of the jugal bone, which is correlative of the increased development of the temporal muscle which moves the lower jaw.

Although thus separated into two groups, according to their mode of obtaining food, the individuals of one and the same species are not in any way, it appears to me, prevented from interbreeding, for we know that they coexist in the same waters, and therefore the characters have no opportunity of becoming fixed and permanent.

The final solution of the problem rests with those who can observe the animals in nature, and, I need hardly add, with a turn of mind different from that which has guided Father Heude in his researches. As regards myself, with the evidence available at

present, I feel reluctant to admit species founded upon the modification (and a modification assumed but in a comparatively late stage of existence) of a single organ, unaccompanied by any but correlative differences; and I maintain under the same species carnivorous as well as conchifragous individuals. As before stated, similar variation is met with at distant points of the globe, and I have no doubt that, as our knowledge progresses, other instances of this supposed dimorphism will be brought to light.

*Synopsis of the Species.*

I. Costal plates eight pairs normally; young with numerous longitudinal dorsal dermal ridges or series of tubercles.—*Old World.*

A. All the costal plates separated on the median line by the neural plates; head very large; postorbital arch extremely narrow, forming a keel on the outer surface ..... 1. *subplanus*, p. 246.

B. Last pair of costal plates in contact on the median line; postorbital arch expanded on the outer surface.

1. Two neural plates between the first pair of costals; alveolar surface of lower jaw without a strong longitudinal ridge at the symphysis.

Inner edge of alveolar surface of mandible strongly raised, forming a sharp ridge, which sends off a short perpendicular process at the symphysis; interorbital space, in the adult skull, narrower than the external nasal opening; head with oblique black lines, converging forwards; no ocellar spots .. 2. *gangeticus*, p. 248.

Inner edge of alveolar surface of mandible not or but very slightly raised, symphysis flat or with a longitudinal furrow; interorbital space narrower than the external nasal opening; head with oblique black lines, converging forwards; young with small ocellar dorsal spots ..... 3. *leithii*, p. 249.

Inner edge of alveolar surface of mandible not or but very slightly raised, symphysis flat or with a longitudinal furrow; interorbital space, in the adult skull, broader than the external nasal opening; head black marbled, with a large yellow spot behind each eye; young with large ocellar dorsal spots . 4. *hurum*, p. 249.

2. A single neural plate between the first pair of costals ;  
alveolar surface of lower jaw with a strong longitudinal  
symphysial ridge.

Epiplastra widely separated from each  
other ; plastral callosities well deve-  
loped and largely pitted ; width of the  
postorbital arch, in the adult, more  
than one third the diameter of the  
orbit ; young with four large ocellar  
dorsal spots .....

5. *formosus*, p. 250.

Epiplastra in contact in front of the  
entoplastron ; plastral callosities very  
feebly developed, finely sculptured ;  
width of the postorbital arch, in the  
adult, more than one third the dia-  
meter of the orbit .....

6. *phayrii*, p. 251.

Epiplastra in contact in front of the  
entoplastron ; plastral callosities well  
developed and largely pitted ; width of  
the postorbital arch not one third the  
diameter of the orbit .....

7. *cartilagineus*, p. 253.

3. A single neural plate between the first pair of costals ;  
alveolar surface of lower jaw without a longitudinal  
symphysial ridge.

- a. Last pair of costal plates well developed ; plastral callo-  
sities well developed in the adult ; snout (on the skull)  
considerably longer than the diameter of the orbit.

Entoplastron forming a right angle .... 8. *triunguis*, p. 254.

Entoplastron forming an obtuse angle .. 9. *sinensis*, p. 256.

- b. Last costal plate not more than half the size of the  
penultimate ; plastral callosities very feebly developed,  
absent on the xiphiplastra ; snout (on the skull) not  
longer than the diameter of the orbit ; proboscis very  
short.

Entoplastron forming a right angle .... 10. *swinhonis*, p. 257.

Entoplastron forming an acute angle .. 11. *euphraticus*, p. 258.

- II. Costal plates seven pairs normally ; young with smooth or  
- finely granulate dorsal skin.—*North America* \*.

Snout (on the skull) obtuse, hardly as  
long as the diameter of the orbit ;

---

\* The following species require further investigation :—

1. *Aspidonectes asper*, Agass. Contr. N. H. U. S. i. p. 405 (1857).—Mississippi.
2. *Aspidonectes nuchalis*, Agass. l. c. p. 406.—Cumberland and Tennessee Rivers.

I regard the species named by Rafinesque, Atlant. Journ. p. 64 (1832), *Apalone hudsonica* and *Mesodeca bartrami*, as mythical.



- nuchal border of dorsal disk without conical tubercles; a light black-edged streak on each side of the head, uniting with its fellow into a large triangular marking extending from between the eyes to the end of the proboscis . . . . 12. *emoryi*, p. 258.
- Snout a little longer than the diameter of the orbit; nuchal border of dorsal disk with conical spine-like tubercles; light head-streaks uniting on the snout, in front of the orbits . . . . . 13. *ferox*, p. 259.
- Snout a little longer than the diameter of the orbit; nuchal border of dorsal disk with conical spine-like tubercles; light head-streaks uniting on the end of the snout, at the base of the proboscis . . 14. *spinifer*, p. 259.
- Snout very narrow and pointed; nuchal border of dorsal disk without conical tubercles. . . . . 15. *muticus*, p. 260.

### 1. *Trionyx subplanus*.

- Trionyx subplanus*, Geoffr. Ann. Mus. xiv. p. 11, pl. v. fig. 2 (1809); Gray, Ill. Ind. Zool. i. pl. lxxix. (1832); Günth. Rept. Brit. Ind. p. 49 (1864); Strauch, Verth. Schildkr. p. 130 (1865).
- Gymnopus subplanus*, Dum. & Bibr. ii. p. 496 (1835).
- Dogania subplana*, Gray, Cat. Tort. p. 49 (1844), and Sh. Rept. i. p. 69, pl. xxxiii. (1855), and Proc. Zool. Soc. 1862, p. 265, and Suppl. Cat. Sh. Rept. i. p. 106 (1870), and Proc. Zool. Soc. 1873, p. 57, fig.
- Trionyx frenatus*, Gray, Cat. Sh. Rept. i. p. 67.
- Dogania güntneri*, Gray, Proc. Zool. Soc. 1862, p. 265, and Suppl. Cat. Sh. Rept. i. p. 107, and Proc. Zool. Soc. 1873, p. 58.
- Trionyx güntneri*, Günth. Rept. Brit. Ind. p. 49, pl. vi. fig. A.
- Potamochelys* ? *frenatus*, Gray, Proc. Zool. Soc. 1864, p. 87.
- Sarberia frenata*, Gray, Proc. Zool. Soc. 1869, p. 220, and Suppl. Cat. Sh. Rept. i. p. 100.
- Platypeltis ferox*, part., Gray, Proc. Zool. Soc. 1873, p. 58.
- Trionyx* ? *dillwynii*, Gray, Ann. & Mag. N. H. (4) xi. p. 306 (1873).

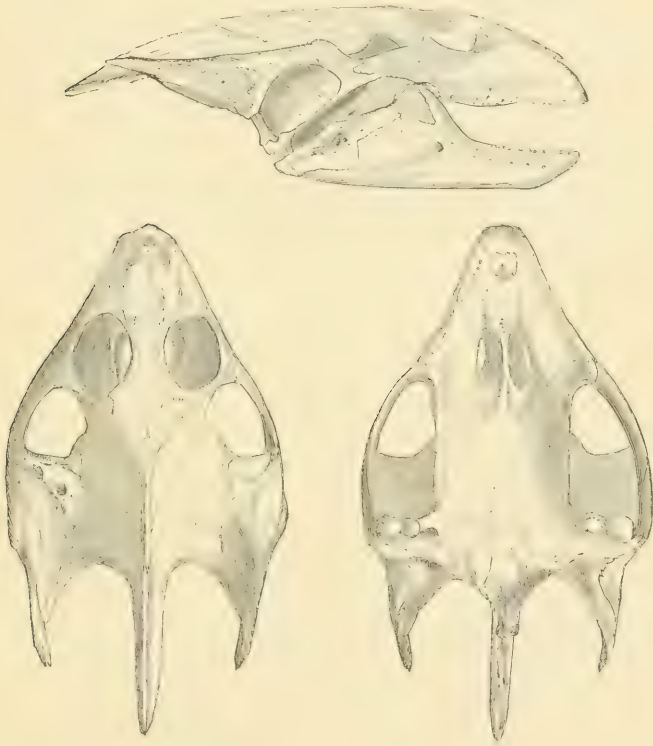
Carapace very flat; costal plates eight pairs, the last well developed and separated by the last neural plate; a single neural between the first pair of costals; these plates very finely granulate and vermiculate; a large fontanelle, till late in life, between the nuchal and dorsal plates. Epiplastra narrowly separated from each other in front of the entoplastron, which forms an obtuse or a right angle; plastral rugosities scarcely developed, on the hyo- and hypoplastra and on the xiphiplastra. Dorsal skin of young with interrupted longitudinal ridges. Head very large; snout (on the skull) about as long as the diameter of the orbit, which is more than double the interorbital width; postorbital arch extremely narrow, forming a

keel on its outer surface ; mandibular symphysis narrower than the diameter of the orbit, without median ridge. Brown above, yellowish beneath and on the sides of the neck ; head and neck with yellowish dots ; some young with an oblique dark streak behind each eye.

Length of dorsal disk 25 centim.

Malay Peninsula, Sumatra, Borneo, Java.

Fig. 65.



Skull of *Trionyx subplanus*. (From Gray, P. Z. S. 1864.)

|                                   |            |                                |
|-----------------------------------|------------|--------------------------------|
| a. Hgr., stffd.                   | Singapore. | Gen. Hardwicke [P.].           |
| b. Hgr., stffd.                   | Singapore. | A. R. Wallace, Esq. [C.].      |
|                                   |            | (Type of <i>T. frenatus</i> .) |
| c. Hgr., skull.                   | Singapore. |                                |
| d. Yg., spir., skull<br>separate. | Pinang.    | Dr. Cantor.                    |
| e. Yg., spir., skull<br>separate. | Java.      | Leyden Museum.                 |

|                                          |         |                                                           |
|------------------------------------------|---------|-----------------------------------------------------------|
| <i>f.</i> Yg., spir.                     | Borneo. | (Type of <i>T. dillwyni</i> .)                            |
| <i>g.</i> Yg., spir., skull<br>separate. | — ?     | (Type of <i>T. frenatus</i> .)                            |
| <i>h.</i> Hgr., stffd.                   | — ?     | East India Comp. [P.].<br>(Type of <i>T. guentheri</i> .) |

## 2. *Trionyx gangeticus*.

*Trionyx gangeticus*, *Cuv. Oss. Foss.* v. pt. 2, p. 186, pl. xi. figs. 5–8 (1824); *Anders. Ann. & Mag. N. H.* (4) ix. p. 382 (1872); *Gray, Ann. & Mag. N. H.* (4) x. p. 333 (1872); *Theob. Proc. As. Soc. Beng.* 1874, p. 77.

*Aspidonectes gangeticus*, *Wagl. Syst. Amph.* pl. ii. figs. xiii.–xviii. (1830).

*Trionyx javanicus* (*non Geoffr.*), *Gray, Syn. Rept.* p. 48 (1831), and *Ill. Ind. Zool.* ii. pl. lxx. (1834); *Günth. Rept. Brit. Ind.* p. 48 (1864).

*Gymnopus duvaucelii*, part., *Dum. & Bibr.* ii. p. 487 (1835).

*Tyrse javanica*, part., *Gray, Cat. Tort.* p. 47 (1844).

*Potamochelys stellata*, part., *Gray, Proc. Zool. Soc.* 1864, p. 85, and *Suppl. Cat. Sh. Rept.* i. p. 104 (1870).

*Trionyx gangeticus*, part., *Gray, Cat. Sh. Rept.* i. p. 66, pl. xlii. fig. 1 (1855), and *Suppl.* p. 97, and *Proc. Zool. Soc.* 1873, p. 47; *Theob. Proc. As. Soc. Beng.* 1875, p. 171, and *Cat. Rept. Brit. Ind.* p. 28. (1876).

— *javanicus*, part., *Gray, Cat. Sh. Rept.* i. p. 67.

*Aspilus gataghol*, *Gray, Ann. & Mag. N. H.* (4) x. p. 339 (1872), and *Proc. Zool. Soc.* 1873, p. 67.

Costal plates eight pairs, the last well developed and in contact throughout on the median line; two neurals between the first pair of costals; plates coarsely pitted and vermiculate. Epiplastra narrowly separated from each other in front of the entoplastron, which forms an obtuse or a right angle; plastral callosities very large, hyo-hypoplastral, xiphiplastral, and, in old specimens, entoplastral. Dorsal skin of young with longitudinal ridges of small tubercles. Head moderate; snout (on the skull) about as long as the diameter of the orbit; interorbital region, in the adult, considerably narrower than the nasal fossa; postorbital arch one third to one half the greatest diameter of the orbit; mandible with the inner edge strongly raised, forming a sharp ridge, which sends off a short perpendicular process at the symphysis; the diameter of the mandible at the symphysis does not exceed the diameter of the orbit. Olive above; back of young vermiculated with fine black lines, but without ocelli; head with a black longitudinal streak from between the eyes to the nape, intersected by two or three **Λ**-shaped black streaks; lower parts yellowish.

Length of dorsal disk 66 centim.

Ganges.

|                                           |             |                    |
|-------------------------------------------|-------------|--------------------|
| <i>a.</i> Ad., skel.                      | Calcutta.   |                    |
| <i>b.</i> Ad., skull.                     | Sultanpoor. | Capt. Boyes [P.].  |
| <i>c.</i> Ad., stffd., skull<br>separate. | India.      | Capt. Boyes [P.].  |
| <i>d.</i> Ad., skull.                     | India.      | Prof. Oldham [P.]. |

|                           |        |                     |
|---------------------------|--------|---------------------|
| <i>e, f.</i> Ad., shells. | India. | R. McClelland, Esq. |
| <i>g.</i> Ad., stffld.    | India. |                     |
| <i>h.</i> Yg., stffld.    | India. |                     |

3. *Trionyx leithii*.

*Aspilus cariniferus*, part., *Gray, Suppl. Cat. Sh. Rept.* i. p. 101 (1870).

*Trionyx leithii*, *Gray, Ann. & Mag. N. H.* (4) x. p. 334 (1872).

— *gangeticus*, part., *Gray, Proc. Zool. Soc.* 1873, p. 47, pl. viii.\*

— *leithii*, part., *Gray, l. c.* p. 49.

*Isola leithii*, *Gray, Ann. & Mag. N. H.* (4) xii. p. 157 (1873).

? *Trionyx gangeticus*, *Murray, Zool. Sind*, p. 342 (1884).

Intermediate between *T. gangeticus* and *T. hurum*. Agrees with the former in the width of the interorbital space, the comparatively short mandibular symphysis, and the markings of the head; with the latter in the longer and more pointed snout, the absence of a strong ridge on the inner alveolar surface of the mandible, and in the presence, in the young, of four or more dorsal ocelli, which are, however, smaller than in *T. hurum*.

This will probably prove to be a Western form, ranging from the Indus to Malabar.

|                           |                             |                          |
|---------------------------|-----------------------------|--------------------------|
| <i>a.</i> Hgr., stffld. { | Poonah.                     | Dr. Leith [P.]. (Types.) |
| <i>b.</i> Hgr., skel. {   |                             |                          |
| <i>c.</i> Yg., stffld.    | Deccan.                     | Col. Sykes [P.].         |
| <i>d.</i> Yg., spir.      | Nelambar River,<br>Malabar. | Col. Beddome [C.].       |
| <i>e.</i> Yg., spir.      | India.                      | T. C. Jerdon, Esq. [P.]. |
| <i>f, g.</i> Yg., stffld. | India.                      |                          |
| <i>h-k.</i> Yg., spir.    | India.                      |                          |
| <i>l-m.</i> Yg., spir.    | India.                      | G. E. Mason, Esq. [P.].  |
| <i>n.</i> Skull & shell.  | India.                      | F. Day, Esq. [P.].       |

4. *Trionyx hurum*.

*Trionyx gangeticus* (*non Cuv.*), *Guérin, Icon. R. A., Rept.* pl. i. fig. 6 (1829); *Lesson, in Bélanger. Voy. Ind. Or., Zool.* p. 297 (1834); *Günth. Rept. Brit. Ind.* p. 47 (1864); *Sowerby & Lear, Tort.* pl. li. (1871).

— *hurum*, *Gray, Syn. Rept.* p. 47, pl. x. (1831), and *Ill. Ind. Zool.* ii. pl. lxxvi. (1834); *Anders. Ann. & Mag. N. H.* (4) ix. p. 382 (1872); *Gray, Ann. & Mag. N. H.* (4) x. p. 335 (1872), and *Proc. Zool. Soc.* 1873, p. 49.

— ocellatus, *Gray, Ill. Ind. Zool.* i. pl. lxxviii. (1832), and *Ann. & Mag. N. H.* (4) x. p. 337 (1872), and *Proc. Zool. Soc.* 1873, p. 51; *Theob. Proc. As. Soc. Beng.* 1875, p. 174, pl. v., and *Cat. Rept. Brit. Ind.* p. 29 (1876).

*Gymnopus duvaucelii*, part., *Dum. & Bibr.* ii. p. 487 (1835).

— ocellatus, *Dum. & Bibr. t. c.* p. 489.

*Tyrse gangetica*, *Gray, Cat. Tort.* p. 47 (1844).

\* Copy of Hardwicke's MS. figures, made from specimens from Futtegerurh.

*Trionyx gangeticus*, part., *Gray, Cat. Sh. Rept.* i. p. 66 (1855), and *Suppl.* p. 97 (1870); *Theob. Proc. As. Soc. Beng.* 1875, p. 171, and *Cat. Rept. Brit. Ind.* p. 28 (1876).

— *sewaaire*, *Gray, Ann. & Mag. N. H.* (4) x. p. 336 (1872), and *Proc. Zool. Soc.* 1873, p. 50, figs.; *Theob. Proc. As. Soc. Beng.* 1875, p. 172, and *Cat. Rept. Brit. Ind.* p. 29.

— *bellii*, *Gray, U. cc.* pp. 337 & 51.

*Nilssonina formosa*, part., *Gray, Proc. Zool. Soc.* 1873, pp. 45 & 46, figs.

*Trionyx buchanani*, *Theob. Proc. As. Soc. Beng.* 1874, p. 78.

? *Trionyx nigricans*, *Anders. Ann. & Mag. N. H.* (4) xvi. p. 284 (1875).

Costal plates eight pairs, the last well developed and in contact throughout on the median line; two neurals between the first pair of costals; plates coarsely pitted and vermiculate. Epiplastra narrowly separated from each other in front of the entoplastron, which forms an obtuse or a straight angle; plastral callosities very large, hyo-hyoplastral, xiphiplastral, and in old specimens entoplastral. Dorsal skin of young with longitudinal ridges of small tubercles. Head moderate; snout (on the skull) a little longer than the diameter of the orbit; interorbital region, in the adult, as broad as the nasal fossa; postorbital arch somewhat more than half the diameter of the orbit in the adult; mandible without strongly raised inner edge or longitudinal symphyseal ridge; the diameter of the mandible at the symphysis exceeds the diameter of the orbit. Olive-brown above and beneath; head, neck, limbs, and border of shell light-dotted; head with large yellow spots, viz. across the snout, behind the orbit, at the angle of the mouth, on the tympanic region and on the chin; these spots become indistinct in the adult, the head of which is more or less closely spotted or vermiculated with black; dorsal disk in the young with dark marblings and four or six very large ocelli.

Length of dorsal disk 40 centim.

Ganges.

*a.* Ad., skel.

*b-c, d-f.* Yg., spir.

*g.* Yg., skull.

*h.* Hgr., skull & shell.

*i.* Yg., skull & carapace.

*k.* Yg., spir.

*l.* Ad., skull.

Calcutta.

Ganges.

Ganges.

Bengal.

India.

— ?

— ?

W. Theobald, Esq. [P.].

W. Theobald, Esq. [P.].

Dr. Falconer [P.].

## 5. *Trionyx formosus*.

*Trionyx formosus*, *Gray, Proc. Zool. Soc.* 1869, p. 217, pl. xv. fig. 1, and *Suppl. Cat. Sh. Rept.* i. p. 99 (1870); *Theob. Cat. Rept. Brit. Ind.* p. 31 (1876).

— *jeudi*, part., *Gray, Suppl.* p. 98.

— *peguensis*, *Gray, Suppl.* p. 99; *Theob. Proc. As. Soc. Beng.* 1875, p. 176, and *Cat. Rept. Brit. Ind.* p. 31; *Anders. Zool. Res. Yunnan*, p. 786, pls. lxx.-lxxiii. (1879).

*Nilssonina formosa*, *Gray, Ann. & Mag. N. H.* (4) x. p. 333 (1872).



*Nilssonia formosa*, part., Gray, *Proc. Zool. Soc.* 1873, p. 46.

*Isola peguensis*, Gray, *l. c.* p. 51, figs.

*Trionyx grayii*, Theob. *Proc. As. Soc. Beng.* 1875, p. 176, pl. iii., and *Cat. Rept. Brit. Ind.* p. 31.

Costal plates eight pairs, the last well developed and in contact throughout on the median line; a single neural between the first pair of costals; plates coarsely pitted and vermiculate. Dorsal skin of young with longitudinal ridges of small tubercles. Epiplastra separated from each other; entoplastron forming an obtuse or straight angle; plastral callosities well developed, hyo-hypoplastral and xiphiplastral, and coarsely sculptured like the carapace. Head moderate; snout (on the skull) about as long as the diameter of the orbit; interorbital region, in the adult, as broad as the nasal fossa; postorbital arch, in the adult, a little less than half the diameter of the orbit; mandible with a strong ridge along the symphysis, the diameter of which equals or a little exceeds that of the orbit. Olive-brown above, white below; head of young ornamented with yellow black-edged markings, the largest being a cross band on each side of the back of the head; these markings disappear in the adult, the head of which is closely spotted with black above and uniform white inferiorly; young with four large dorsal ocelli, as in *T. hurum*.

Size of *T. hurum*.

Burma.

- |                                                  |                          |                                                           |
|--------------------------------------------------|--------------------------|-----------------------------------------------------------|
| a. Yg., spir., skull separate,<br>mandible lost. | Pegu.                    | W. Theobald, Esq. [C.]<br>(Type.)                         |
| b. Head, spir., skull separate.                  | Pegu.                    | W. Theobald, Esq. [C.]<br>(Type of <i>T. peguensis</i> .) |
| c. Hgr., skull & shell.                          | Thayet-Myo,<br>Irawaddy. | W. Theobald, Esq. [E.]<br>(Type of <i>T. grayi</i> .)     |
| d. Yg., skull.                                   | Burma.                   | W. Theobald, Esq. [E.]                                    |

## 6. *Trionyx phayrii*.

*Trionyx phayrei*, Theob. *Journ. Linn. Soc.* x. p. 18 (1868); *Anders. Proc. Zool. Soc.* 1871, p. 154; *Theob. Proc. As. Soc. Beng.* 1875, p. 175, and *Cat. Rept. Brit. Ind.* p. 30 (1876).

—jeudi, Gray, *Proc. Zool. Soc.* 1869, p. 217, figs., and *Suppl. Cat. Sh. Rept.* i. p. 97 (1870), and *Ann. & Mag. N. II.* (4) x. p. 336 (1872), and *Proc. Zool. Soc.* 1873, p. 49.

—*cariniferus* (non Gray), Theob. *Proc. As. Soc. Beng.* 1874, p. 80, pl. iv.

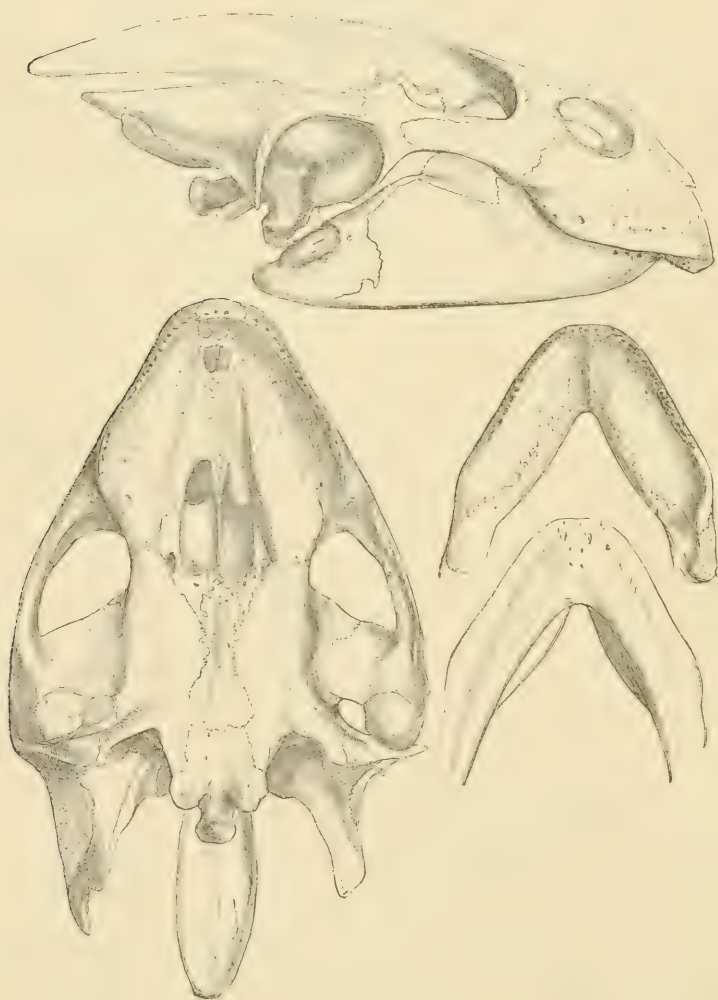
Costal plates eight pairs, the last well developed, with slightly concave posterior border, and in contact on the median line; a single neural between the first pair of costals; plates rather coarsely pitted and vermiculate. Epiplastra in contact in front of the entoplastron, which forms an obtuse or straight angle; plastral callosities hardly developed, the hyoplastra bearing a mere trace of sculpture. Head moderate; skull as in *T. formosus*, but snout a little longer in the adult. Head of adult spotted or vermiculated with black above and uniform whitish inferiorly, as in *T. formosus*.

Length of dorsal disk 50 centim.

Burma; Java?

- |                                   |                            |                                                                                            |
|-----------------------------------|----------------------------|--------------------------------------------------------------------------------------------|
| <i>a.</i> Ad., skull<br>& shell.  | Araccan range, W. of Pegu. | W. Theobald, Esq. [C.]<br>Shell presented by the Council of<br>the Bristol Museum. (Type.) |
| <i>b.</i> Hgr., skull<br>& shell. | Pegu.                      | W. Theobald, Esq. [P.]                                                                     |
| <i>c.</i> Yg., skull.             | Pegu.                      | W. Theobald, Esq. [P.]                                                                     |
| <i>d.</i> Ad., skull.             | Java?                      | (Type of <i>T. jeudi</i> .)                                                                |

Fig. 66.

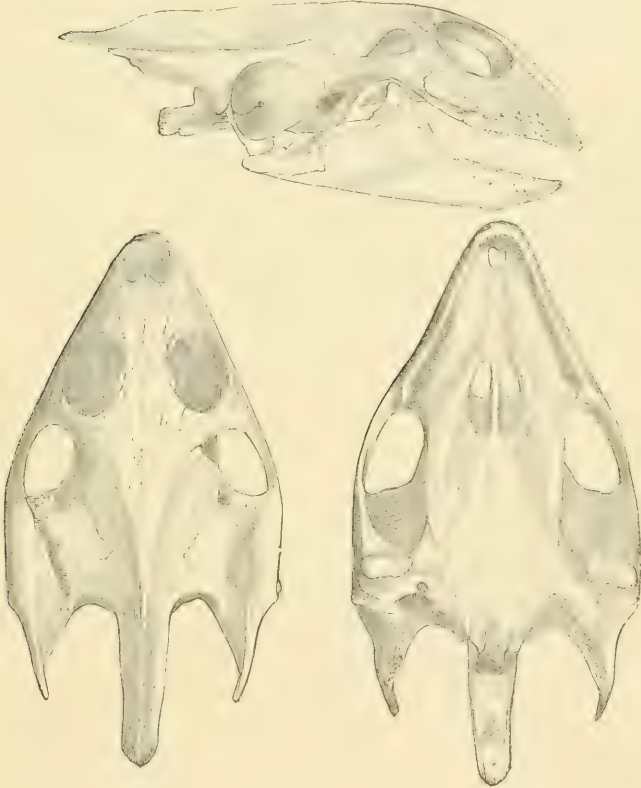


Skull of *Trionyx phayrii*. (From Gray, P. Z. S. 1869.)

7. *Trionyx cartilagineus*.

- Testudo cartilaginea*, *Boddaert, Epistola ad W. Roëll, cum tab.* (1770).  
 — *rostrata*, *Thunberg, Vetensk. Ac. Handl.* viii. p. 179, pl. vii.  
 figs. 2 & 3 (1787); *Schoepff, Test.* p. 93, pl. xx. (1792).  
*Trionyx stellatus*, *Geoffr. Ann. Mus.* xiv. p. 13 (1809); *Theob. Proc.*  
*As. Soc. Beng.* 1874, p. 79, pl. iii., and *Cat. Rept. Brit. Ind.* p. 30  
 (1876).  
 — *javanicus*, *Geoffr. l. c.* p. 15, pl. iii.; *Dum. & Bibr.* ii. p. 493  
 (1835); *Strauch, Chelon. Stud.* p. 177 (1862), and *Verth. Schildkr.*  
 p. 127 (1865); *Theob. Proc. As. Soc. Beng.* 1875, p. 176, pl. v.  
 fig. D; *Boettger, Ber. Senck. Ges.* 1887, p. 39.

Fig. 67.

Skull of *Trionyx cartilagineus*. (From Gray, P. Z. S. 1864.)

- Aspidonectes javanicus*, *Wagl. Syst. Amph.* pl. ii. figs. i.-xx. (1830).  
*Trionyx stellatus*, var. *javanica*, *Schleg. Faun. Japon., Rept.* pl. v.  
 f. 6 (1838).  
*Gymnopus cartilaginea*, *Cantor, Cat. Mal. Rept.* p. 9 (1847).  
*Trionyx cariniferus*, *Gray, Cat. Sh. Rept.* i. p. 67, pl. xxxii. (1855).  
 — *ornatus*, *Gray, Proc. Zool. Soc.* 1861, p. 41, pl. v.; *Günth. Rept.*  
*Brit. Ind.* p. 48, pl. vi. fig. B (1864).

*Aspilus cariniferus*, Gray, *Proc. Zool. Soc.* 1864, p. 83, figs., and *Suppl. Cat. Sh. Rept.* i. p. 101 (1870).

— ? *punctulatus*, Gray, *ll. cc.* pp. 84, 102.

— ? *ornatus*, Gray, *ll. cc.* pp. 85, 103.

*Ida ornata*, Gray, *Proc. Zool. Soc.* 1873, p. 55, figs.

*Aspilus javanicus*, Gray, *l. c.* p. 67, fig.

*Trionyx ephippium*, Theob. *Proc. As. Soc. Beng.* 1875, p. 177, pl. v.

Costal plates eight pairs, the last well developed and forming a median suture behind the last neural; a single neural between the first pair of costals; dorsal plates coarsely pitted and vermiculate. Dorsal skin of young with longitudinal ridges of small tubercles. Epiplastra in contact, or narrowly separated, in front of the entoplastron, which forms an obtuse or a right angle; plastral callosities well developed in the adult, hyo-hypoplastral and xiphiplastral, and coarsely sculptured like the carapace. Head moderate; snout (on the skull) considerably longer than the diameter of the orbit; interorbital region, in the adult, as broad as or a little narrower than the nasal fossa; postorbital arch very narrow, one third or one fourth the diameter of the orbit; mandible with a strong ridge along the symphysis, the diameter of which equals or exceeds the diameter of the orbit. Olive-brown above and on the chin; head and chin with numerous yellow spots, the largest of which are below the temple; dorsal disk of young light-dotted, and usually with a few large blackish spots; lower parts white.

Size of *T. hurum*.

Pegu, Tenasserim, Siam, Camboja, Malay Peninsula; Sumatra, Borneo, Java.

|                                         |                       |                                                  |
|-----------------------------------------|-----------------------|--------------------------------------------------|
| <i>a.</i> Hgr., skull & shell.          | Pegu.                 | W. Theobald, Esq. [P.].                          |
| <i>b.</i> Yg., head & shell, spir.      | Mergui.               | W. Theobald, Esq. [P.].                          |
| <i>c.</i> Hgr., stffd.                  | Siam.                 | (Type of <i>T. ephippium</i> .)                  |
| <i>d.</i> Yg., stffd.                   | Camboja.              | M. Mouhot [C.].                                  |
| <i>e-f.</i> Yg., spir., skull separate. | Camboja.              | M. Mouhot [C.].                                  |
| <i>g.</i> Yg., dry.                     | Pinang.               | M. Mouhot. (Types of <i>T. ornatus</i> .)        |
| <i>h.</i> Hgr., stffd.                  | Sarawak.              | Dr. Cantor.                                      |
| <i>i.</i> Ad., skull.                   | Sarawak.              | A. R. Wallace, Esq. [C.].                        |
| <i>k.</i> Ad., skull.                   | Borneo.               |                                                  |
| <i>l-m.</i> Yg., spir.                  | Borneo.               | L. D. Dillwyn, Esq. [P.].                        |
| <i>n.</i> Hgr., stffd., skull separ.    | Java.                 |                                                  |
| <i>o-p.</i> Yg., spir.                  | Java.                 |                                                  |
| <i>q, r-s.</i> Yg., spir.               | [Amboina or Ceram ??] | Madame Ida Pfeiffer [C.].                        |
| <i>t.</i> Yg., spir.                    | [Moluccas ??]         | Leyden Museum. (Type of <i>T. cariniferus</i> .) |

### 8. *Trionyx triunguis*.

*Testudo triunguis*, Forskal, *Descr. Anim.* p. ix (1775).

*Trionyx ægyptiacus*, Geoffr. *Ann. Mus.* xiv. p. 12, pls. i. & ii. (1809), and *Descr. Egypte*, i. p. 115, pl. i. (1809); *Strauch, Chelon.*

- Stud.* p. 175 (1862), and *Verth. Schildkr.* p. 126 (1865); *Doetty. Ber. Senck. Ges.* 1879-80, p. 208 (1880).  
*Trionyx niloticus*, *Gray, Syn. Rept.* p. 46 (1831), and *Cat. Sh. Rept.* i. p. 68 (1855).  
*Gymnopus ægyptiacus*, *Dum. & Bibr.* ii. p. 484 (1835).  
*Trionyx labiatus*, *Bell, Test.* pls. — (1837).  
*Tyrse nilotica*, *Gray, Cat. Tort.* p. 48 (1844), and *Proc. Zool. Soc.* 1864, p. 88, and *Suppl. Cat. Sh. Rept.* i. p. 108 (1870), and *Ann. & Mag. N. H.* (4) xi. p. 470 (1873).  
*Trionyx mortoni*, *Hallow. Proc. Ac. Philad.* 1844, p. 120.  
*Aspidonectes aspilus*, *Cope, Proc. Ac. Philad.* 1859, p. 295.  
*Fordia africana*, *Gray, Proc. Zool. Soc.* 1869, p. 219, and *Suppl. Cat. Sh. Rept.* i. p. 100, and *Proc. Zool. Soc.* 1873, p. 43, figs.  
*Trionyx triunguis*, *Peters, Mon. Berl. Ac.* 1876, p. 117.

Costal plates eight pairs, the last well developed and in contact throughout on the median line; a single neural between the first pair of costals; dorsal plates coarsely pitted and vermiculate. Dorsal skin of young with longitudinal ridges of small tubercles. Epiplastra widely separated, the anterior branch short; entoplastron forming a right or acute angle; plastral callosities well developed in the adult, hyo-hyoplastral and xiphiplastral, and coarsely sculptured like the carapace. Head small; snout (on the skull) much longer than the diameter of the orbit; interorbital space, in the adult, at least as broad as the nasal fossa; postorbital arch not half the diameter of the orbit; mandible without symphysial ridge, its width at the symphysis equalling or exceeding the diameter of the orbit. Olive above, closely spotted and speckled with whitish in the young; throat and lower surface of shell with round white spots separated by a dark network; adult more uniform.

Length of dorsal disk 80 centim.

Africa (Nile, Congo, Senegal, and intermediate water-systems) and Syria.

|                                           |              |                                    |
|-------------------------------------------|--------------|------------------------------------|
| <i>a, b.</i> Ad. & yg., stfid.            | Egypt.       | Dr. T. Christie [P.].              |
| <i>c.</i> Ad., stfid.                     | Egypt.       | T. Thornton, Esq. [P.].            |
| <i>d.</i> Hgr., stfid.                    | Egypt.       | Zoological Society.                |
| <i>e.</i> Hgr., skel.                     | Egypt.       | Dr. Rüppell [C.].                  |
| <i>f, g.</i> Ad., stfid., skull separate. | Chartoum.    | Consul Petherick [C.].             |
| <i>h.</i> Yg., spir.                      | Chartoum.    | (Types of <i>Fordia africana</i> ) |
| <i>i.</i> Yg., spir.                      | Nile.        | Consul Petherick [C.].             |
| <i>k.</i> Yg., spir.                      | Gambia.      | Zoological Society.                |
| <i>l.</i> Ad., stfid.                     | Gaboon.      | Dr. Baikie [C.].                   |
| <i>m-p.</i> Yg., spir.                    | Lower Congo. | M. Du Chailu [C.].                 |
| <i>q-t.</i> Yg., spir.                    | W. Africa.   | M. A. Linden [C.].                 |
| <i>u.</i> Yg., spir.                      | W. Africa.   | Dr. Baikie [C.].                   |
| <i>v.</i> Ad., skull & hyoid bones.       | W. Africa.   | G. Malcolm, Esq. [P.].             |
| <i>w.</i> Hgr., skel.                     | — ?          | J. J. Monteiro, Esq. [P.].         |



9. *Trionyx sinensis*.

- Trionyx* (*Aspidonectes*) *sinensis*, *Wiegman. Nov. Act. Ac. Leop.-Carol.* xvii. p. 189 (1834).  
 — *stellatus*, var. *japonica*, *Schleg. Faun. Japon., Rept.* p. 33, pl. vii. (1838).  
 — *japonicus*, *Schleg. Abbild.* p. 108, pl. xxxi. (1840).  
 — *tuberculatus*, *Cantor, Ann. & Mag. N. H.* ix. p. 482 (1842); *Gray, Proc. Zool. Soc.* 1861, p. 42.  
*Tyrse perocellata*, *Gray, Cat. Tort.* p. 48 (1844).  
*Trionyx perocellatus*, *Gray, Cat. Sh. Rept.* i. p. 65, pl. xxxi. (1855).  
 — *maackii*, *Brandt, Bull. Ac. St. Pétersb.* xvi. p. 110 (1857).  
 — *schlegelii*, *Brandt, l. c.*  
 — *sinensis*, *Strauch, Chelon. Stud.* p. 177 (1862); *Günth. Rept. Brit. Ind.* p. 46 (1864); *Strauch, Verth. Schildkr.* p. 128 (1865), and *Voy. Przewalski, Rept.* p. 5, pl. i. (1876).  
*Potamochelys* ? *perocellatus*, *Gray, Proc. Zool. Soc.* 1864, p. 86.  
 — *tuberculatus*, *Gray, l. c.* p. 87, and *Suppl. Cat. Sh. Rept.* i. p. 105 (1870).  
*Landemania irrorata*, *Gray, Proc. Zool. Soc.* 1869, p. 216, fig., and *Suppl. Cat. Sh. Rept.* i. p. 96, and *Ann. & Mag. N. H.* (4) xii. p. 160 (1873).  
 — *perocellata*, *Gray, Proc. Zool. Soc.* 1869, p. 216, and *Suppl. Cat. Sh. Rept.* i. p. 96, and *Proc. Zool. Soc.* 1873, p. 53, figs., and *Ann. & Mag. N. H.* (4) xii. p. 159 (1873).  
*Psilogonathus lævis*, *Heude, Mém. Hist. Nat. Emp. Chin.* i. p. 24, pl. ii. (1880).  
*Temnognanthus mordax*, *Heude, l. c.* p. 26, pl. iii.  
*Gomphopelta officinæ*, *Heude, l. c.* p. 27, pl. iv.  
*Cœlogonathus novem-costatus*, *Heude, l. c.* p. 29, pl. v.  
*Tortisternum novem-costatum*, *Heude, l. c.* p. 31, pl. vi.  
*Ceramopelta latirostris*, *Heude, l. c.* p. 33, pl. vii.  
*Coptopelta septem-costata*, *Heude, l. c.* p. 35, pl. viii.  
*Cinctisternum bicinctum*, *Heude, l. c.* p. 37, pl. ix.

Costal plates normally eight pairs \*, the last well developed and in contact throughout on the median line; a single neural between the first pair of costals; dorsal plates finely pitted and vermiculate. Dorsal skin of young with longitudinal ridges of small tubercles. Epiplastra separated from each other; entoplastron broad at each end, forming an obtuse angle; plastral callosities well developed in the adult, hyo-hypoplastral, xiphiplastral, and sometimes also entoplastral, finely sculptured like the carapace. Head moderate; snout (on the skull) longer than the diameter of the orbit; inter-orbital space usually narrower than the nasal fossa; postorbital arch at least half the diameter of the orbit in the adult; mandible without symphysial ridge, its width at the symphysis exceeding the diameter of the orbit. Olive above, uniform or light-dotted, dorsal disk frequently with a few scattered blackish spots; head above with small spots or dots; frequently a few black streaks radiating from the orbit, a rostral, a temporal, and an interorbital being usually distinct; chin and throat spotted or marbled with white on a dark ground; plastron whitish, in the young usually with sym-

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\* Nine pairs are present in specimen *h*.

metrical black spots or bands; young usually with a pair of black spots in front of the tail, and a black band on the hinder side of the thighs.

Length of dorsal disk 20 centim.

China and Japan.

|                                                               |                               |                                                                            |
|---------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------|
| <i>a-g</i> . Ad., hgr., & yg.,<br>spir.                       | Chefoo.                       | R. Swinhoe, Esq. [C.].                                                     |
| <i>h-i</i> , <i>k-r</i> . Ad., spir.,<br>skull separate.      | Shanghai.                     | R. Swinhoe, Esq. [C.].                                                     |
| <i>s</i> . Ad., spir.                                         | Shanghai.                     | (Type of <i>Landemania irrorata</i> .)                                     |
| <i>t-u</i> . Hgr., spir.                                      | Shanghai.                     |                                                                            |
| <i>v</i> . Ad., skel.                                         | Shanghai.                     |                                                                            |
| <i>w-y</i> . Yg., spir.                                       | Mountains N. of<br>Kiu-Kiang. | Mr. Pratt [C.].                                                            |
| <i>z-β</i> . Hgr. & yg., spir.                                | Chusan.                       | Dr. Cantor. (Types of <i>T. tuberculatus</i> and <i>T. perocellatus</i> .) |
| <i>γ</i> . Ad., spir.                                         | Foo Choo.                     | St. Petersburg Museum [E.].                                                |
| <i>δ-ε</i> , <i>ζ</i> . Ad. & hgr.,<br>spir., skull separate. | Formosa.                      | R. Swinhoe, Esq. [C.].                                                     |
| <i>η</i> . Yg., spir.                                         | China.                        | Dr. B. Seeman [C.]. Haslar<br>Collection.                                  |
| <i>θ</i> . Ad., stfld.                                        | China.                        |                                                                            |
| <i>ι</i> . Ad., skel.                                         | China.                        |                                                                            |

#### 10. *Trionyx swinhonis*.

*Oscaria swinhoei*, Gray, *Ann. & Mag. N. H.* (4) xii. p. 157, pl. v. (1873).

Yuen leprosus, Heude, *Mém. Hist. Nat. Emp. Chin.* i. p. 20 (1880).

— *maculatus*, Heude, *l. c.* p. 22, pl. i.

— *elegans*, Heude, *l. c.* p. 23.

— *viridis*, Heude, *l. c.*

— *pallens*, Heude, *l. c.*

Costal plates eight pairs, the last not more than half the size of the penultimate, and forming a median suture; a single neural between the first pair of costals; plates coarsely pitted. Epiplastra separated from each other; entoplastron forming a right angle; plastral callosities feebly developed, on the hyo- and hypoplastra. Head moderate, with very short proboscis; snout (on the skull) short, obtuse, about as long as the diameter of the orbit, which is about double the width of the interorbital space and thrice the width of the postorbital arch; mandibular symphysis narrower than the diameter of the orbit, without median ridge. Blackish green above, elegantly marked with very numerous roundish yellow spots of unequal sizes; dorsal shield with interrupted yellow lines, some of which radiate, while others extend across the costal sutures; plastron mostly greyish.

Length of dorsal disk 33 centim.

Very closely allied to *T. euphraticus*.

China.

|                                        |           |                                   |
|----------------------------------------|-----------|-----------------------------------|
| <i>a</i> . Ad., spir., skull separate. | Shanghai. | R. Swinhoe, Esq. [C.].<br>(Type.) |
|----------------------------------------|-----------|-----------------------------------|

11. *Trionyx euphraticus*.

*Testudo euphratica*, *Daud. Rept.* ii. p. 305 (1802).

— *rafeht*, *Olivier, Voy. Emp. Othom.* vi. p. 328, pl. xli. (1807).

*Trionyx euphraticus*, *Geoffr. Ann. Mus.* xiv. p. 17 (1809).

*Gymnopus euphraticus*, *Dum. & Bibr.* ii. p. 498 (1835).

*Trionyx*, sp., *Martin, Proc. Zool. Soc.* 1840, p. 56.

*Tyrse rafeht*, *Gray, Cat. Tort.* p. 49 (1844).

*Trionyx rafeht*, *Gray, Cat. Sh. Rept.* i. p. 65, pl. xxx. (1855).

*Rafetus euphraticus*, *Gray, Proc. Zool. Soc.* 1864, p. 81, and *Suppl.*

*Cat. Sh. Rept.* i. p. 104 (1870), and *Proc. Zool. Soc.* 1873, p. 65, figs.

Costal plates eight pairs, the last not more than half the size of the penultimate, and forming a median suture; a single neural between the first pair of costals; plates rather coarsely pitted and vermiculate; a fontanelle persists late in life between the nuchal and the first neural and costal plates. Epiplastra separated from each other; entoplastron forming an acute angle; plastral callosities feebly developed, on the hyo- and hypoplastra. Head moderate, with very short proboscis; snout (on the skull) short, obtuse, about as long as the diameter of the orbit, which is double the width of the inter-orbital space, and thrice the width of the postorbital arch; mandibular symphysis narrower than the diameter of the orbit, without median ridge. Dark green above, whitish below.

Length of dorsal disk 37 centim.

Tigris and Euphrates.

|                                        |            |                          |
|----------------------------------------|------------|--------------------------|
| <i>a.</i> Ad., stfid., skull separate. | Euphrates. | W. K. Loftus, Esq. [P.]. |
| <i>b.</i> Ad., stfid.                  | Euphrates. | Capt. Chesney [P.].      |

12. *Trionyx emoryi*.

*Aspidoneectes emoryi*, *Agassiz, Contr. N. H. U. S.* i. p. 407, pl. vi. fig. 4 (1857).

Closely allied to the two following species, but differing in the shorter snout, which hardly equals the diameter of the orbit, the shorter proboscis, and the absence of conical tubercles on the anterior border of the dorsal disk. Olive above, young with minute black dots and a broad pale margin to the dorsal disk. Head, neck, and limbs dotted with black; a light black-edged streak on each side of the head, passing through the eye, and uniting with its fellow into a large triangular marking, extending from between the eyes to the end of the proboscis.

Length of dorsal disk 30 centim.

Texas and Rio Grande System.

|                                        |                    |                     |
|----------------------------------------|--------------------|---------------------|
| <i>a.</i> Hgr., spir., skull separate. | Rio Grande.        | Smithsonian Instit. |
| <i>b-c.</i> Yg., spir.                 | Matamoras, Mexico. | Smithsonian Instit. |

13. *Trionyx ferox*.

*Pennant & Garden, Phil. Tr.* lxi. p. 266, pl. x. figs. 1-3 (1771).

*Testudo ferox, Schneid. Schildkr.* p. 330 (1783); *Schoepff, Test.* p. 88, pl. xix. (1792); *Daud. Rept.* ii. p. 69 (1802).

— *verrucosa, Schoepff, l. c.* p. 90.

? *Testudo bartrami, Daud. l. c.* p. 74.

*Trionyx carinatus, Geoffr. Ann. Mus.* xiv. p. 14, pl. iv. (1809).

— *georgicus, Geoffr. l. c.* p. 17.

— *ferox, Schweigg. Prodr.* p. 15 (1814).

— *brongnartii, Schweigg. l. c.* p. 18.

— *ferox, part., Leconte, Ann. Lyc. N. Y.* iii. p. 93 (1830);

*Holbr. N. Am. Herp.* ii. p. 11 (1842); *Gray, Cat. Tort.* p. 49

(1844), and *Sh. Rept.* i. p. 68 (1855); *Strauch, Chelon. Stud.*

p. 173 (1862), and *Verth. Schildkr.* p. 122 (1865).

? *Trionyx bartrami, Leconte, l. c.* p. 96.

*Gymnopus spiniferus, part., Dum. & Bibr.* ii. p. 477 (1835).

*Platypeltis ferox, Agassiz, Contr. N. H. U. S.* i. p. 401, pl. vi. fig. 3 (1857); *Gray, Suppl. Cat. Sh. Rept.* i. p. 107 (1870).

*Gymnopus spiniferus, Wied, N. Act. Ac. Leop.-Carol.* xxxii. i. p. 48 (1865).

*Platypeltis ferox, part., Gray, Proc. Zool. Soc.* 1873, p. 58.

Costal plates normally seven pairs; a single neural between the first pair of costals; plates rather coarsely pitted and vermiculate. Dorsal disk of young smooth, or with small scattered tubercles, without well-marked longitudinal ridges; a series of conical tubercles on the nuchal border. Epiplastra widely separated from each other, short; entoplastron forming a right angle; plastral callosities well developed, hyo-hyoplastral and xiphiplastral. Head moderate; snout (on the skull) a little longer than the diameter of the orbit; inter-orbital space hardly half the diameter of the orbit; postorbital arch narrow; mandibular symphysis shorter than the diameter of the orbit. Olive above, with scattered small round black spots or dots; young with a pale black-edged border to the dorsal disk; a light, black-edged streak on each side of the head, passing through the eye, uniting with its fellow on the snout, just in front of the orbits; limbs spotted and marbled with black.

Length of dorsal disk 42 centim.

S.E. United States, from Georgia to Western Louisiana.

|                          |             |                             |
|--------------------------|-------------|-----------------------------|
| a. Ad., stfld.           | Georgia.    | Royal Society [P.]. (Type.) |
| b. Hgr., stfld.          | Louisiana.  | W. P. Smith [C.].           |
| c. d. Ad., stfld., skull | N. America. | W. P. Smith [C.].           |
| separ., and yg., stfld.  |             |                             |
| e. Yg., spir.            | N. America. |                             |

14. *Trionyx spinifer*.

*Trionyx spiniferus, Lesueur, Mém. Mus. Paris*, xv, p. 258, pl. vi. (1827).

— *ferox, part., Leconte, Ann. Lyc. N. Y.* iii. p. 93 (1830); *Holbr.*

*N. Am. Herp.* ii. p. 11, pl. i. (1842); *Gray, Cat. Tort.* p. 49

(1844), and *Sh. Rept.* i. p. 68 (1855); *Strauch, Chelon. Stud.*

p. 173 (1862), and *Verth. Schildkr.* p. 122 (1865).

*Gymnopus spiniferus*, part., *Dum. & Bibr.* ii. p. 477, pl. xxii. fig. 1 (1835).

*Trionyx ferox*, *DeKay, N. Y. Faun.* iii. p. 6, pl. vi. fig. 11 (1842).

*Tyrse argus*, *Gray, Cat. Tort.* p. 48 (1844), and *Knowsley Menag.* pl. — (1846).

*Trionyx argus*, *Gray, Cat. Sh. Rept.* i. p. 68 (1855).

*Aspidonectes spinifer*, *Agassiz, Contr. N. H. U. S. i.* p. 403, pl. vi. figs. 1 & 2 (1857).

*Gymnopus olivaceus*, *Wied, N. Act. Ac. Leop.-Carol.* xxxii. i. p. 55, pl. v. (1865).

*Callinia spinifera*, *Gray, Proc. Zool. Soc.* 1869, p. 222, and *Suppl. Cat. Sh. Rept.* i. p. 109 (1870), and *Proc. Zool. Soc.* 1873, p. 60, figs.

Very closely allied to the preceding, but carapace flatter\*, snout and interorbital region narrower, and markings different. Dorsal disk with small black spots and ring-like markings, which may become indistinct with age; young with a pale, black-edged border to the dorsal disk; a light, black-edged streak on each side of the head, passing through the eye, uniting with its fellow at the base of the proboscis; limbs spotted and marbled with black.

Length of dorsal disk 30 centim.

Middle and Northern tributaries of the Mississippi; Ohio; Saint Lawrence River.

|                                 |                        |                                              |
|---------------------------------|------------------------|----------------------------------------------|
| a. Hgr., spir.                  | Foxbury, Pennsylvania. | Smithsonian Institution.                     |
| b. Hgr., spir., skull separate. | Wabash River.          |                                              |
| c, d, e. Hgr. & yg., spir.      | N. America.            |                                              |
| f. Hgr., stffid.                | — ?                    | Lord Derby [P.]. (Type of <i>T. argus</i> .) |

### 15. *Trionyx muticus* †.

*Trionyx muticus*, *Lesueur, Mém. Mus.* xv. p. 263, pl. vii. (1827); *Leconte, Ann. Lyc. N. Y.* iii. p. 95 (1830); *Holbr. N. Am. Herp.* ii. p. 19, pl. ii. (1842); *Gray, Cat. Tort.* p. 50 (1844), and *Sh. Rept.* i. p. 69 (1855); *Strauch, Chelon. Stud.* p. 174 (1862), and *Verth. Schildkr.* p. 125 (1865).

*Gymnopus muticus*, *Dum. & Bibr.* ii. p. 482 (1835).

*Amyda mutica*, *Agassiz, Contr. N. H. U. S. i.* p. 399, pl. vi. figs. 6 & 7 (1857); *Gray, Suppl. Cat. Sh. Rept.* i. p. 95 (1870); *Baur, Zool. Anz.* 1887, p. 99.

*Potamochelys* ? *microcephala*, *Gray, Proc. Zool. Soc.* 1864, p. 87.

*Callinia microcephala*, *Gray, Proc. Zool. Soc.* 1869, p. 222, and *Suppl. Cat. Sh. Rept.* i. p. 108, and *Proc. Zool. Soc.* 1873, p. 62, figs.

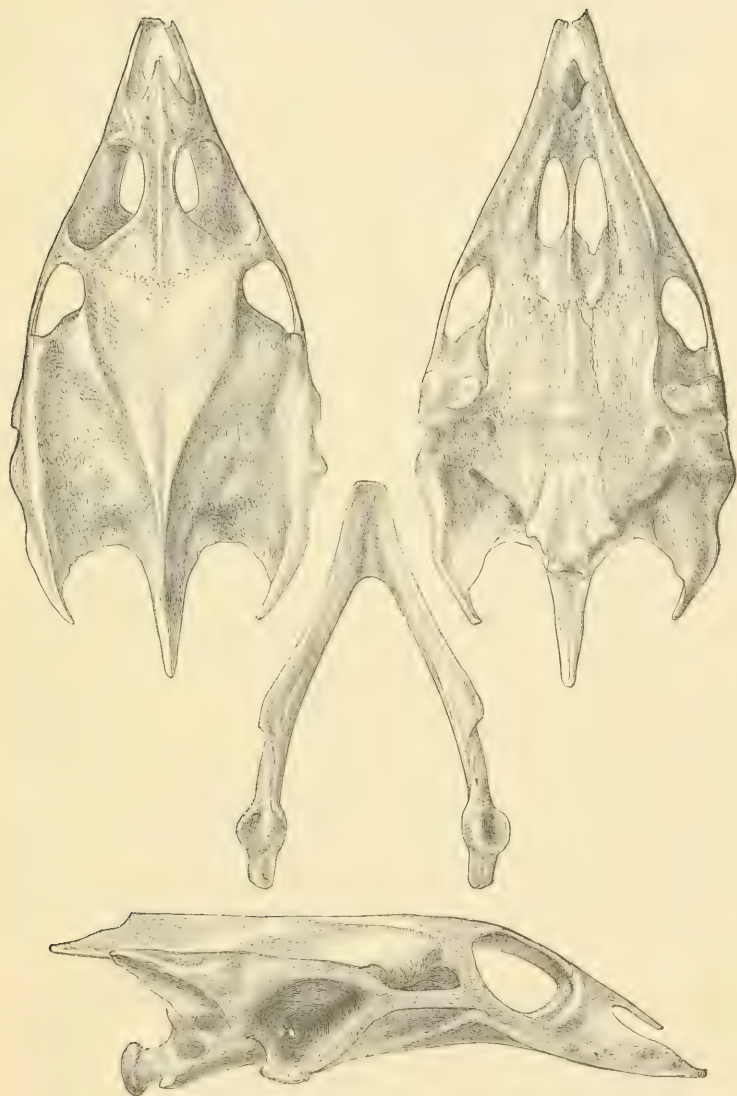
Differs from the preceding in the much narrower, sharply pointed snout, the absence of conical tubercles on the anterior border of the dorsal disk and on the posterior cartilaginous margin, and in the absence of a papilla on each side of the nasal septum, which is considerably wider than in other Trionychoids. Entoplastron, in the

\* A small eighth pair of costal plates is present in one of our specimens.

† In addition to the single specimen in the Museum, I have recently examined a fully adult living specimen, from which the following notes are taken.



Fig. 68.

Skull of *Trionyx muticus*, enlarged. (From Gray, P. Z. S. 1873.)

adult, with a callosity; each epiplastron likewise with a callosity, which is, however, very minute. Brown above, whitish inferiorly; head without markings; back blotched with darker brown.

The length of the dorsal disk does not exceed 25 centim.

Mississippi, Ohio, and Saint Lawrence.

*a.* Hgr., stfid., skull separate. — ? \* (Type of *Callinia microcephala*.)

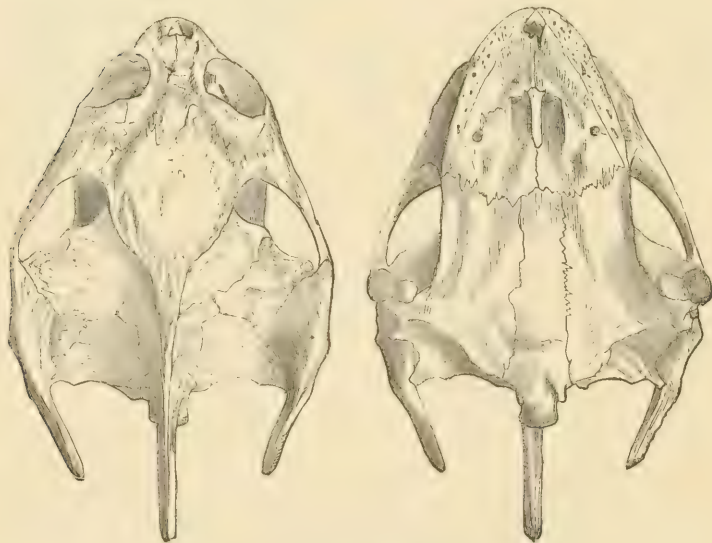
## 2. PELOCHELYS.

Chitra, part., *Gray, Cat. Sh. Rept.* i. p. 70 (1855); *Günth. Rept. Brit. Ind.* p. 50 (1864).

*Pelochelys*, *Gray, Proc. Zool. Soc.* 1864, p. 89, and *Suppl. Cat. Sh. Rept.* i. p. 90 (1870), and *Proc. Zool. Soc.* 1873, p. 40.

Outer extremities of the nuchal plate overlying the second dorsal rib; neural plates well developed. Limbs completely exposed. Hyoplastron distinct from hypoplastron; not more than five plastral

Fig. 69.



Skull of *Pelochelys cantoris*. (From Gray, P. Z. S 1864.)

callosities. Bony choanæ between the orbits; jaws weak; post-orbital arch as broad as the diameter of the orbit; pterygoids posterior border free, without ascending process.

East Indies.

\* The specimen, stated to have been obtained by Mr. Wallace at Sarawak, was purchased at Stevens's sales.

1. *Pelochelys cantoris*.

- Chitra indica*, part., *Gray, Cat. Tort.* p. 49 (1844), and *Sh. Rept.* i. p. 70 (1855); *Günth. Rept. Brit. Ind.* p. 50, pl. vi. fig. C (1864).  
*Gymnopus indicus*, *Cantor, Cat. Mal. Rept.* p. 10 (1847).  
*Pelochelys cantorii*, *Gray, Proc. Zool. Soc.* 1864, p. 90, figs., and *Suppl. Cat. Sh. Rept.* i. p. 90 (1870); *Theob. Cat. Rept. Brit. Ind.* p. 28 (1876).  
 — *cumingii*, *Gray, ll. cc.* pp. 90, 91.  
 — *bibronii*, *Gray, ll. cc.*

Costal plates eight pairs, the last well developed and forming a median suture; a single neural between the first pair of costals; plates coarsely pitted and vermiculate. Dorsal skin of young tuberculate. Epiplastra small and widely separated; entoplastron forming a right or an acute angle; plastral callosities largely developed. Head moderate; snout very short and broad; proboscis very short; interorbital space broader than the greatest diameter of the orbit; mandible narrowest at the symphysis. Olive above, uniform or spotted with darker; lips and throat of young olive, speckled with whitish; plastron whitish.

Length of dorsal disk 60 centim.

Ganges, Burma, Malay Peninsula, Borneo, Philippines.

|                                      |                 |                         |
|--------------------------------------|-----------------|-------------------------|
| a. Hgr., stfild., skull<br>separate. | Pinang.         | Dr. Cantor. (Type.)     |
| b. Ad., stfild.                      | Akyab, Burma.   | W. Theobald, Esq. [C.]. |
| c. Yg., shell.                       | Burma.          | W. Theobald, Esq. [C.]. |
| d. Hgr., shell.                      | India?          | F. Day, Esq. [P.].      |
| e. Ad., skel.                        | Koelei, Borneo. | Hr. Carl Bock [C.].     |
| f. Ad., stfild.                      | Philippines.    | H. Cuming, Esq. [C.].   |
| g. Yg., spir.                        | Philippines.    | H. Cuming, Esq. [C.].   |

(Types of  
*P. cum-  
ingii*.)

## 3. CHITRA.

- Trionyx*, part., *Gray, Syn. Rept.* p. 45 (1831); *Strauch, Chelon. Stud.* p. 50 (1862).  
*Gymnopus*, part., *Dum. & Bibr.* ii. p. 472 (1835).  
*Chitra*, *Gray, Cat. Tort.* p. 49 (1844), and *Proc. Zool. Soc.* 1864, p. 91, and *Suppl. Cat. Sh. Rept.* i. p. 89 (1870), and *Proc. Zool. Soc.* 1873, p. 40.  
*Chitra*, part., *Gray, Cat. Sh. Rept.* i. p. 70 (1855); *Günth. Rept. Brit. Ind.* p. 50 (1864).

Outer extremities of the nuchal plate overlying the second dorsal rib; neural plates well developed. Limbs completely exposed. Hyoplastron distinct from hypoplastron; not more than five plastral callosities. Bony choanæ behind the orbits, which are situated quite at the anterior extremity of the skull; jaws weak; postorbital arch at least twice as broad as the diameter of the orbit; pterygoids, posterior border free, without ascending process.

East Indies.

1. *Chitra indica*.

*Trionyx indicus*, Gray, *Syn. Rept.* p. 47 (1831).

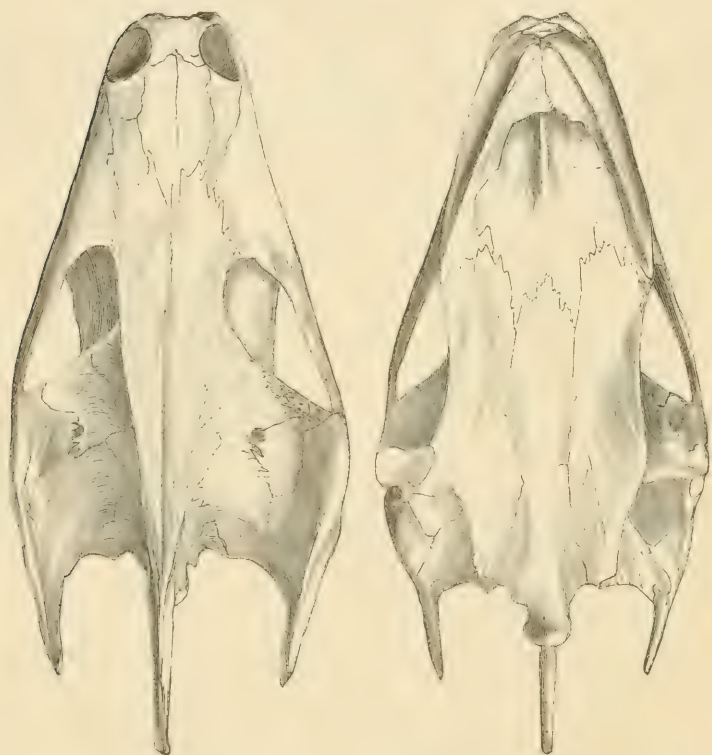
— *egyptiacus*, var. *indicus*, Gray, *Ill. Ind. Zool.* i. pl. lxxx. (1832).

*Gymnopus lineatus*, Dum. & Bibr. ii. p. 491 (1835).

*Chitra indica*, part., Gray, *Cat. Tort.* p. 49 (1844), and *Sh. Rept.* i. p. 70, pl. xlii. (1855); *Günth. Rept. Brit. Ind.* p. 50 (1864).

— *indica*, Gray, *Proc. Zool. Soc.* 1864, p. 91, figs., and *Suppl. Cat. Sh. Rept.* i. p. 89 (1870); *Theob. Cat. Rept. Brit. Ind.* p. 27 (1876).

Fig. 70.

Skull of *Chitra indica*. (From Gray, P. Z. S. 1864.)

Costal plates eight pairs, the last well developed and forming a median suture; a single neural between the first pair of costals; plates coarsely pitted and vermiculate. Epiplastra widely separated; entoplastron forming an acute angle; plastral callosities largely developed. Head small, with extremely short snout; interorbital space considerably narrower than the greatest diameter of the orbit.

Olive or green above, whitish inferiorly; dorsal disk of young with dark vermiculations; head and neck with dark longitudinal lines.

Length of dorsal disk 60 centim.

Ganges and Irawaddy.

|                                     |            |                         |
|-------------------------------------|------------|-------------------------|
| <i>a, b.</i> Hgr. & yg., stfid.     | India.     | Capt. Boyes [C.].       |
| <i>c.</i> Ad., skel.                | Calcutta.  |                         |
| <i>d.</i> Ad., skel. (incomplete).  | Allahabad. | W. Theobald, Esq. [E.]. |
| <i>e.</i> Ad., skull & hyoid bones. | Nepal.     | Dr. Falconer [P.].      |

#### 4. CYCLODERMA.

*Cycloderma*, *Peters, Mon. Berl. Ac.* 1854, p. 216, and *Reise n. Mossamb.* iii. p. 9 (1882).

*Cyclanosteus*, part., *Gray, Cat. Sh. Rept.* i. p. 64 (1855).

*Heptathyra*, *Cope, Proc. Ac. Philad.* 1859, p. 294; *Gray, Suppl. Cat. Sh. Rept.* i. p. 92 (1870), and *Proc. Zool. Soc.* 1873, p. 41.

*Aspidochelys*, *Gray, Proc. Zool. Soc.* 1860, p. 6.

*Cycloderma*, part., *Strauch, Chelon. Stud.* p. 55 (1862).

Nuchal notched at the outer end, which underlies the first costal plate; no prænuchal bone; neural plates well developed, eight or nine in number, forming a continuous series; eighth pair of costals large in the adult, forming a median suture. Plastron with a cutaneous femoral valve, under which the hind limb may be concealed; hyoplastron coossified with hypoplastron; seven plastral callosities (in the adult). Bony choanæ between the orbits; jaws comparatively feeble; postorbital arch very broad, much broader than the diameter of the orbit; posterior border of pterygoids with a median ascending process forming a suture with the opisthotic.

Tropical Africa.

##### 1. *Cycloderma frenatum*.

*Cycloderma frenatum*, *Peters, Mon. Berl. Ac.* 1854, p. 216, and *Reise n. Mossamb.* iii. p. 14, pls. i.-iii. A (1882).

*Cyclanosteus frenatus*, *Gray, Cat. Sh. Rept.* i. p. 64 (1855).

*Aspidochelys livingstonii*, *Gray, Proc. Zool. Soc.* 1860, p. 6, pl. xxii.

*Heptathyra livingstonii*, *Gray, Proc. Zool. Soc.* 1864, p. 94.

— *frenata*, *Gray, l. c.*, and *Suppl. Cat. Sh. Rept.* i. p. 93 (1870).

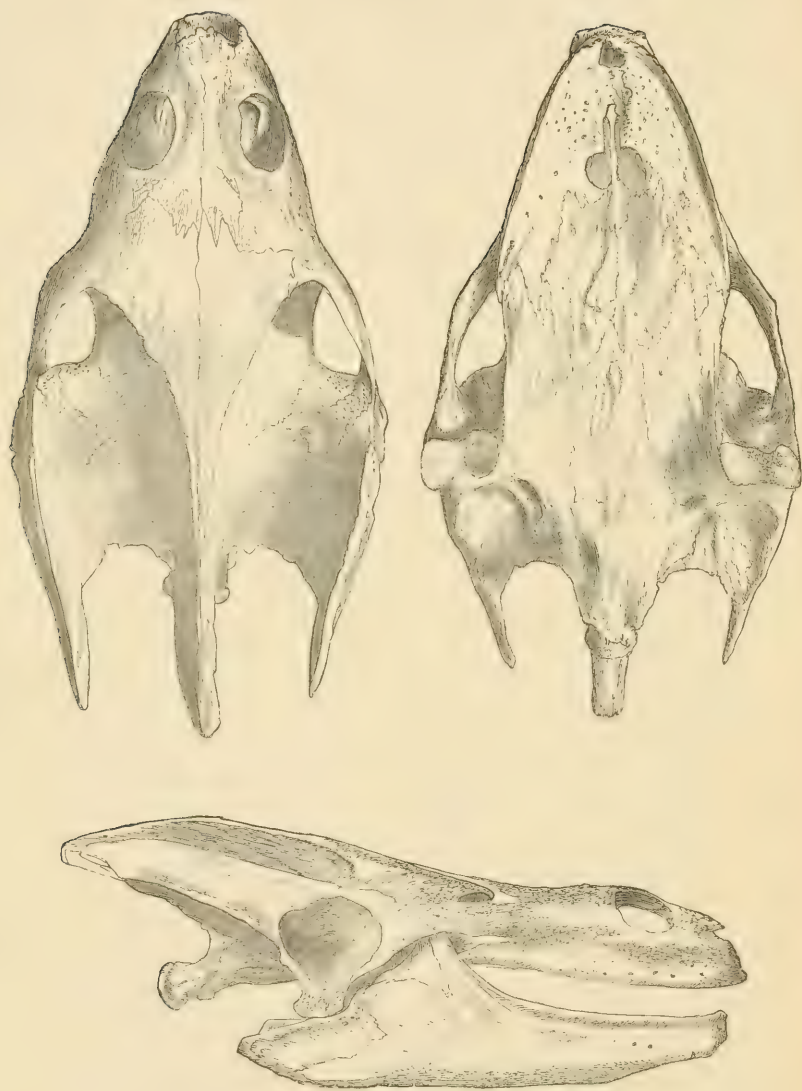
Carapace and plastral callosities finely granulate and vermiculate; two neural plates between the first pair of costals; seven plastral callosities, of which the entoplastral is very small, transverse, subrescentic; hyo-hyoplastral callosities widely separated from each other. Head much depressed, with the eyes quite anterior, the snout very short; interorbital space very narrow, not half the diameter of the orbit. Dark green above, head and neck with black longitudinal bands.

Length of dorsal disk 50 centim.

Zambezi.



Fig. 71.



Skull of *Cycloderma aubryi*. (From Gray, P. Z. S. 1864.)

- a.* Ad., shell. Zambezi. Dr. Livingstone [P.]. (Type of *Aspidochelys livingstonii*.)  
*b.* Skull, hyoid, & foot. Zambezi. Sir J. Kirk [P.].  
 (From the first Livingstone Expedition.)

2. *Cycloderma aubryi*.

*Cryptopus aubryi*, *A. Dum. Rev. et Mag. de Zool.* viii. p. 374, pl. xx. (1856).

*Heptathyra aubryi*, *Cope, Proc. Ac. Philad.* 1859, p. 294; *Gray, Suppl. Cat. Sh. Rept.* i. p. 93 (1870).

*Cycloderma aubryi*, *A. Dum. Arch. Mus.* x. p. 166 (1860); *Peters, Mon. Berl. Ac.* 1876, p. 117, pl. —.

*Heptathyra frenata*, part., *Gray, Proc. Zool. Soc.* 1864, p. 93, figs.

Differs from the preceding in the broader interorbital region, which measures at least two thirds the diameter of the orbit; and in the larger plastral callosities, especially the entoplastral, which, instead of being by far the smallest of all, is the largest next to the hyo-hypoplastral and subcircular in shape; hyo-hypoplastral callosities in contact on the median line. Brown above; young orange, with a few black spots and a black vertebral line on the body, and three black streaks along the head and neck.

Length of dorsal disk 45 centim.

Gaboon and Ogowai.

- |                                   |         |                      |
|-----------------------------------|---------|----------------------|
| <i>a.</i> Ad., stffl.             | Gaboon. | M. Du Chaillu [C.].  |
| <i>b.</i> Ad., shell.             | Gaboon. | M. Du Chaillu [C.].  |
| <i>c.</i> Ad., skel., incomplete. | Gaboon. | [M. Du Chaillu [C.]. |

## 5. EMYDA.

*Trionyx*, part., *Geoffr. Ann. Mus.* xiv. p. 1 (1809); *Schweigg. Prodr.* p. 18 (1814); *Fitzing. Syst. Rept.* p. 7 (1826).

*Trionyx*, *Wagl. Syst. Amph.* p. 134 (1830).

*Emyda*, *Gray, Syn. Rept.* p. 49 (1831), and *Cat. Tort.* p. 46 (1844), and *Sh. Rept.* i. p. 63 (1855); *Strauch, Chelon. Stud.* p. 56 (1862); *Günth. Rept. Brit. Ind.* p. 44 (1864); *Gray, Suppl. Cat. Sh. Rept.* i. p. 117 (1870), and *Proc. Zool. Soc.* 1873, p. 71.

*Cryptopus*, part., *Dum. & Bibr.* ii. p. 499 (1835).

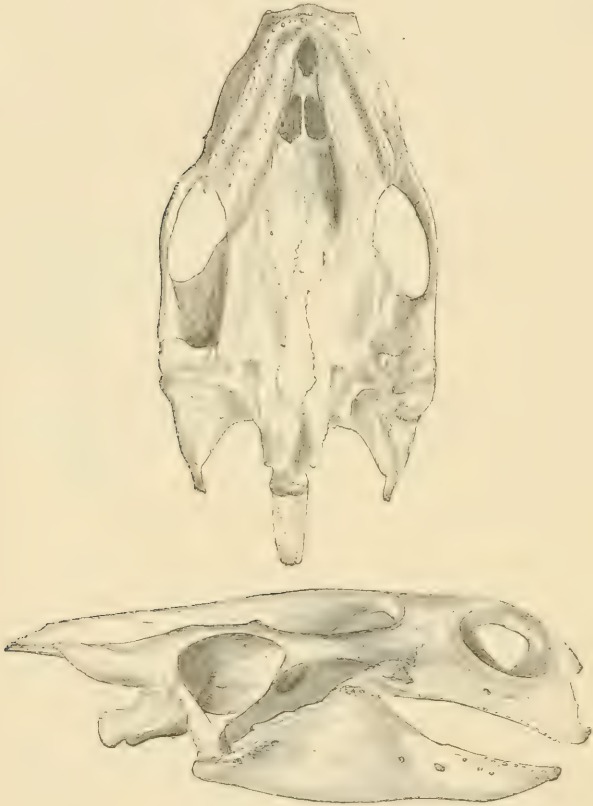
*Potamochelys*, part., *Gray, Proc. Zool. Soc.* 1864, p. 85, and *Suppl. Cat. Sh. Rept.* p. 104, and *Ann. & Mag. N. H.* (4) x. p. 338 (1872).

Nuchal notched at each outer end, which underlies the first costal plate; dorsal shield large, with a series of bony plates in the posterior cutaneous border and a prænuchal marginal bony plate; neural plates well developed, seven or eight in number, forming a continuous series; eighth pair of costals large in the adult, and, like the penultimate, forming a median suture. Plastron with a cutaneous femoral valve, under which the hind limb may be concealed; hyoplastron coossified with hypoplastron; seven plastral callosities (in the adult). Bony choanæ between the orbits; jaws strong; postorbital arch moderate, much narrower than the diameter

of the orbit; posterior border of pterygoids with a median ascending process forming a suture with the opisthotic.

East Indies.

Fig. 72.



Skull of *Emyda granosa*. (From Gray, P. Z. S. 1864.)

*Synopsis of the Species.*

- |                                                                               |                             |
|-------------------------------------------------------------------------------|-----------------------------|
| Head with yellow spots; entoplastral callosity small .....                    | 1. <i>granosa</i> , p. 269. |
| Head without yellow spots; first marginal plate much larger than second ..... | 2. <i>vittata</i> , p. 269. |
| Head without yellow spots; first marginal plate not larger than second .....  | 3. <i>scutata</i> , p. 270. |

1. *Emyda granosa*.

- Testudo granosa*, *Schoepff, Test.* p. 127, pl. xxx. (1792).  
 — *granulata*, *Daud. Rept.* ii. p. 81, pl. xix. fig. 2 (1802).  
*Trionyx coromandelicus*, *Geoffr. Ann. Mus.* xiv. p. 16 (1809); *Wagl. Syst. Amph.* pl. ii. figs. xxi.-xxxiii. (1830); *Lesson, in Bélanger. Voy. Ind. Or., Zool.* p. 296 (1834).  
 — *granosus*, *Schweigg. Prodr.* p. 18 (1814); *Gray, Ill. Ind. Zool.* ii. pl. lxiii. (1834).  
*Emyda punctata*, *Gray, Syn. Rept.* p. 49 (1831); *Bell, Test.* pls. — (1836); *Gray, Cat. Tort.* p. 46 (1844), and *Sh. Rept.* i. p. 63 (1855), and *Suppl.* p. 117 (1870).  
*Trionyx punctata*, *Gray, Ill. Ind. Zool.* ii. pl. lxiv.  
*Cryptopus granosus*, *Dum. & Bibr.* ii. p. 501, pl. xxii. fig. 2 (1835).  
*Emyda granosa*, *Strauch, Chelon. Stud.* p. 57 (1862); *Günth. Rept. Brit. Ind.* p. 45 (1864); *Strauch, Verth. Schildkr.* p. 131 (1865); *Gray, Ann. & Mag. N. H.* (4) xi. p. 306 (1873); *Theob. Cat. Rept. Brit. Ind.* p. 32 (1876).  
*Potamochelys stellata*, part., *Gray, Proc. Zool. Soc.* 1864, p. 85, fig., and *Suppl. Cat. Sh. Rept.* p. 104.  
*Emyda dura*, *Anders. Journ. Linn. Soc.* xii. p. 514 (1876).

Carapace and plastral callosities finely and uniformly granulate; two neural plates between the first pair of costals; anterior marginal very large, much larger than the others; seven plastral callosities, of which the entoplastral is much the smallest; the extent of these callosities varying considerably, not only with age, but according to individuals. Head moderate; snout short. Skin of dorsal disk, in the young, longitudinally plaited. Olive-brown above, with round yellow spots on the head and back, which become less distinct in adult specimens; plastron and margin of carapace yellowish white.

Length of dorsal disk 25 centim.

India.

|                                               |                           |                                   |
|-----------------------------------------------|---------------------------|-----------------------------------|
| a. Yg., spir.                                 | Allahabad, N.W.<br>India. | Messrs. v. Schlagintweit<br>[C.]. |
| b. Yg., spir.                                 | Sikkim.                   | Messrs. v. Schlagintweit<br>[C.]. |
| c-e. Hgr. & yg., spir.                        | Calcutta.                 | F. Day, Esq. [P.].                |
| f. Ad., loose bones.                          | Bengal.                   | Gen. Hardwicke [P.].              |
| g. Hgr., skel.                                | Poonah.                   | Dr. Leith [P.].                   |
| h-i, k. Yg., spir.                            | India.                    |                                   |
| l. Yg., spir.                                 | India.                    | G. E. Mason, Esq. [P.].           |
| m, n, o, p, q, r. Ad.,<br>hgr., & yg., stfdd. | India.                    |                                   |
| s, t. Hgr., skulls &<br>shells.               | India.                    | Dr. Falconer [P.].                |
| u. Ad., skull.                                | India.                    | Prof. Oldham [P.].                |
| v, w, x Ad. & hgr.,<br>skulls.                | India.                    | W. Theobald, Esq. [E.].           |
| y, z. Ad., shells.                            | India.                    |                                   |

2. *Emyda vittata*.

- Emyda punctata* (*non Gray*), *Kelaart, Prodr. Faun. Zeyl.* p. 179 (1852).  
 — *vittata*, *Peters, Mon. Berl. Ac.* 1854, p. 216; *Günth. Rept. Brit.*

*Ind.* p. 46 (1864); *Blanf. Journ. As. Soc. Beng.* xxxix. p. 343 (1870); *Theob. Cat. Rept. Brit. Ind.* p. 32 (1876); *Lydekker, Pal. Ind.* (10) iii. p. 197, pl. xxvi. fig. 1 (1885).  
*Emyda ceylonensis*, *Gray, Cat. Sh. Rept.* i. p. 64, pl. xxix. A (1855); *Günth. l. c.* p. 45; *Gray, Suppl. Cat. Sh. Rept.* i. p. 117 (1870), and *Ann. & Mag. N. H.* (4) xi. p. 307 (1873).

Under this name may be provisionally grouped such specimens as agree with *E. granosa* except in the uniform brown colour of the upper parts (with or without darker bands on the head and neck) and usually in the larger entoplastral and xiphiplastral callosities. The constancy of and the correlation between these characters, however, still require to be tested upon a larger number of specimens.

Ceylon, India.

|                              |         |                                                   |
|------------------------------|---------|---------------------------------------------------|
| <i>a.</i> Ad., shell.        | Ceylon. | Dr. Kelaart. (Type of<br><i>E. ceylonensis</i> .) |
| <i>b, c-d.</i> Yg., spir.    | Ceylon. |                                                   |
| <i>e-h.</i> Ad. & yg., spir. | — ?     | Lord Arthur Russell [P.].                         |

### 3. *Emyda scutata*.

*Emyda scutata*, *Peters, Mon. Berl. Ac.* 1868, p. 449; *Theob. Cat. Rept. Brit. Ind.* p. 32 (1876); *Anders. An. Zool. Res. Yunnan*, p. 779, pls. lxxiv., lxxv., & lxxv. A. figs. 12-16 (1879).  
 — *fuscumaculata*, *Gray, Ann. & Mag. N. H.* (4) xi. p. 308 (1873).

Very closely allied to *E. granosa* and *E. vittata*, but anterior marginals less enlarged, less unequal in size, the first not larger than the second. Entoplastral callosity large or moderate. Brown above, carapace spotted or reticulated with darker.

Burma.

|                                     |          |                                                                |
|-------------------------------------|----------|----------------------------------------------------------------|
| <i>a-d.</i> Ad., hgr., & yg., spir. | Rangoon. | M. L. Fea [C.].                                                |
| <i>e.</i> Yg., spir.                | Pegu.    | W. Theobald, Esq. [C.]. (Type<br>of <i>E. fuscumaculata</i> .) |
| <i>f.</i> Yg., spir.                | Pegu.    | W. Theobald, Esq. [C.].                                        |
| <i>g, h.</i> Ad. & yg., shells.     | Burma.   | W. Theobald, Esq. [P.].                                        |

### 6. CYCLANORBIS.

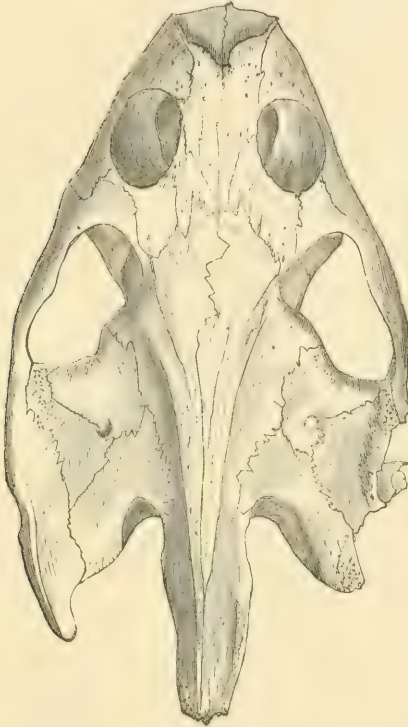
*Cryptopus*, part., *Dum. & Bibr.* ii. p. 499 (1835).  
*Cyclanorbis*, *Gray, Proc. Zool. Soc.* 1852, p. 135.  
*Cyclanosteus*, *Gray, Proc. Zool. Soc.* 1855, p. 201, and *Suppl. Cat. Sh. Rept.* i. p. 111 (1870), and *Proc. Zool. Soc.* 1873, p. 70.  
*Cyclanosteus*, part., *Gray, Cat. Sh. Rept.* i. p. 64 (1855).  
*Cycloderma*, part., *Strauch, Chelon. Stud.* p. 55 (1862).  
*Tetrathya*, *Gray, Proc. Zool. Soc.* 1865, p. 323, and *Suppl. Cat. Sh. Rept.* i. p. 109, and *Proc. Zool. Soc.* 1873, p. 70.  
*Baikiea* (non *Gray*, 1865), *Gray, Suppl. Cat. Sh. Rept.* i. p. 114, and *Proc. Zool. Soc.* 1873, p. 69.

Nuchal not notched at the outer ends, which extend slightly below the first costal plate; a prænuchal bone (absent in the young); neural plates forming an incomplete series, some or all of



the costals meeting on the median line and separating the neurals from each other; eighth pair of costals large. Plastron with a

Fig. 73.



Skull of *Cyclanorbis senegalensis*. (From Gray, P. Z. S. 1864.)

cutaneous femoral valve, under which the hind limb may be concealed; hyoplastron coossified with hypoplastron; nine or more plastral callosities in the adult, a pair being present in front of, and ossifying independently from, the epiplastrals. Bony choanæ between the orbits; jaws strong; postorbital arch moderate, narrower than the diameter of the orbit; posterior border of pterygoids with a median ascending process forming a suture with the opisthotic.

Tropical Africa.

### 1. *Cyclanorbis senegalensis*.

*Cryptopus senegalensis*, Dum. & Bibr. ii. p. 504 (1835).

*Emyda senegalensis*, Gray, *Cat. Tort.* p. 47 (1844), and *Sh. Rept.* i. p. 64 (1855).

*Cyclanorbis petersii*, Gray, *Proc. Zool. Soc.* 1852, p. 135.

*Cyclanosteus petersii*, Gray, *Proc. Zool. Soc.* 1855, p. 201, and *Cat. Sh. Rept.* i. p. 64, pl. xxix.

*Cycloderma senegalense*, A. Dum. Arch. Mus. x. p. 168 (1860).

— *petersii*, Strauch, Chelon. Stud. p. 56 (1862).

*Cyclanosteus senegalensis*, Gray, Proc. Zool. Soc. 1864, p. 95, and 1865, p. 422, figs., and Suppl. Cat. Sh. Rept. i. p. 112 (1870), and Proc. Zool. Soc. 1873, p. 70.

*Tetrathyra baikii*, Gray, Proc. Zool. Soc. 1865, p. 324, fig., and Suppl. Cat. Sh. Rept. p. 110.

*Baikiea elegans*, part., Gray, Proc. Zool. Soc. 1869, p. 222, and Suppl. Cat. Sh. Rept. p. 115.

Carapace and plastral callosities rather finely granulate and vermiculate; two neural plates between the first pair of costals; at least nine plastral callosities in the adult, sometimes more, additional small plates being present on the sides of the epiplastra and between the latter and the hyoplastra; xiphiplastral plates usually the smallest; the hyo-hypoplastral and epiplastral callosities developed before the others. Head moderate; snout short; orbit nearly equidistant from the nasal and temporal fossæ; interorbital space at least half the greatest diameter of the orbit in the adult; no protuberance at the symphysis of the mandible. Dorsal disk of young with longitudinal ridges of small tubercles. Olive above, uniform or with small dark spots on the dorsal disk; head with numerous small light spots; plastron yellowish, clouded with brown.

Length of dorsal disk 35 centim.

Senegambia to Upper Nile.

|                                   |            |                                                           |
|-----------------------------------|------------|-----------------------------------------------------------|
| <i>a.</i> Hgr., shell.            | Gambia.    | Earl of Derby [P.]. (Type of <i>C. petersii</i> .)        |
| <i>b.</i> Hgr., skel., imperfect. | Gambia.    | Earl of Derby [P.].                                       |
| <i>c.</i> Yg., spir.              | Senegal.   |                                                           |
| <i>d-f, g-m.</i> Yg., spir.       | W. Africa. | Dr. B. Baikie [C.].                                       |
| <i>n.</i> Ad., stffd.             | W. Africa. | Dr. B. Baikie [C.].                                       |
| <i>o, p.</i> Yg., stffd.          | W. Africa. | Dr. B. Baikie [C.]. (Types of <i>Tetrathyra baikii</i> .) |
| <i>q.</i> Hgr., shell.            | W. Africa. | Dr. B. Baikie [C.].                                       |
| <i>r, s, t.</i> Ad., skulls.      | W. Africa. | Dr. B. Baikie [C.]. (Types of <i>Baikiea elegans</i> .)   |
| <i>u, v, w.</i> Hgr., skulls.     | W. Africa. | Dr. B. Baikie [C.].                                       |
| <i>x, y.</i> Hgr., shells.        | —?         |                                                           |

## 2. *Cyclanorbis elegans*.

*Baikiea elegans*, part., Gray, Proc. Zool. Soc. 1869, p. 222, pl. xv. f. 2, and Suppl. Cat. Sh. Rept. i. p. 115 (1870).

This species, which is known from quite young specimens only, differs from the preceding in the presence of a strong knob on the inner surface of the symphysis of the mandible, in the larger dorsal dermal tubercles, and in the coloration. Dorsal and ventral disks dark brown, the former with very large irregular yellowish spots, the latter with small round spots of the same colour; head and chin with closely-set yellowish spots separated by a brown network.

West Africa.

|                                             |            |                              |
|---------------------------------------------|------------|------------------------------|
| <i>a.</i> Yg., spir.; <i>b.</i> Yg., stffd. | W. Africa. | Dr. B. Baikie [C.]. (Types.) |
|---------------------------------------------|------------|------------------------------|

## Order EMYDOSAURIA.

Emydo-Sauriens, *Blainville, Bull. Soc. Philom.* 1816.

Loricata, *Merrem, Tent. Syst. Amph.* 1820.

Emydosauri, *Gray, Ann. Phil.* (2) x. 1825.

Crocodili, *Wagler, Syst. Amph.* 1830.

Quadrato bone immovably united to cranial arches; two horizontal bony temporal arches. Cervical and dorsal ribs mostly two-headed, the middle dorsals articulating with the transverse processes of the neural arch. Sternum and interclavicle present; seven or eight transverse series of "abdominal ribs," not connected with the vertebral ribs, each composed of four ossicles forming an angle directed forwards. Teeth present in the jaws, implanted in alveoli. Ventricle of the heart divided by a complete septum. Pectoral and abdominal cavities separated from each other by a muscular diaphragm. Anal opening longitudinal. Copulatory organ present, simple.

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The existing members of this Order, the most highly organized of all recent Reptilia, cannot in my opinion be divided into several families. The fact that *Tomistoma* is altogether quite as much related to the long-snouted Crocodiles as to the true Gavial is opposed to the separation of the *Gavialidæ*. The only constant important character between the Crocodiles and the Alligators is the increased number of mandibular teeth in the latter, which is the same as in *Tomistoma*. The well-known Cuvierian character of the fourth mandibular tooth fitting into a notch in *Crocodylus* and into a pit in *Alligator* is not absolutely diagnostic, since, as already observed by Huxley, specimens of the short-snouted *Crocodylus palustris* occur which agree in this respect with the Alligators, whilst, on the other hand, Cope has described a supposed Alligator in which the fourth tooth, on one side, fits into a notch. The short-snouted species of *Crocodylus* and *Osteolemus* further agree with the Alligators in the mandibular teeth biting inwards of the maxillary teeth instead of between them. *Osteolemus*, although agreeing with *Crocodylus* in its dentition, stands in most other respects nearer the Alligators. A rather trifling character, recently pointed out by Baur, viz. the absence of a more or less developed pointed process on the free border of the quadratojugal, distinguishes *Alligator* and *Caiman* from the other Crocodilians.

## Fam. 1. CROCODILIDÆ.

Crocodylidae, *Gray, Ann. Phil.* (2) x. 1825.

Crocodyliens ou Aspidiotes, *Duméril & Bibron, Erp. Gén.* iii. 1836.

Crocodylidae, Alligatoridae, *Gray, Cat. Tort. &c.* 1844.

Gavialidae, Crocodylidae, Alligatoridae, *Huxley, Journ. Linn. Soc.* iv. 1860; *Gray, Cat. Sh. Rept.* ii. 1872.

Nares anterior; choanæ opening far back between the pterygoids, which, like the palatines and maxillaries, are produced into osseous plates joining on the median line of the palate; orbit communicating with the infratemporal fossa. Vertebrae procœlous; ribs with uncinæ processes. No clavicles. Pubis excluded from acetabulum. Manus with five well-developed digits, pes with four. A dorsal armour of bony scutes. Ears with movable opercles.

The pupil is vertical in all the species. With the possible exception of *Perosuchus fuscus*, the three inner digits are clawed.

*Synopsis of the Genera.*

- I. Nasal bones widely separated from the nasal aperture; splenial elements entering the mandibular symphysis, which extends at least to the fifteenth tooth.

$\frac{27-29}{25-26}$  teeth on each side, none of the mandibular received into pits; nasal bones widely separated from the præmaxillaries.

1. *Gavialis*, p. 275.

$\frac{20-21}{15-19}$  teeth on each side, the lateral mandibular received into pits between the maxillary teeth; nasal bones in contact with the præmaxillaries ..... 2. *Tomistoma*, p. 276.

- II. Nasals entering the nasal aperture; splenial elements not entering the mandibular symphysis, which does not extend beyond the eighth tooth.

A. Fourth mandibular tooth usually fitting into a notch in the upper jaw;  $\frac{16-19}{14-15}$  teeth on each side.

No bony nasal septum ..... 3. *Crocodylus*, p. 277.

Nasal bones dividing the nasal aperture .. 4. *Osteolaemus*, p. 288.

B. Fourth mandibular tooth usually fitting into a pit in the upper jaw;  $\frac{17-20}{17-22}$  teeth on each side.

Nasal bones dividing the nasal aperture; dorsal bony scutes not articulated together; ventral bony scutes absent or very thin.

5. *Alligator*, p. 289.

No bony nasal septum; a dorsal and a ventral armour of articulated, overlapping bony scutes ..... 6. *Caiman*, p. 291.

## 1. GAVIALIS.

Gavials ou Longirostres, *Cuvier, Ann. Mus.* x. p. 27 (1807).

Gavialis, *Oppel, Ordn. Rept.* p. 19 (1811); *Dum. & Bibr.* iii. p. 132 (1836); *Gray, Cat. Tort. &c.* p. 57 (1844); *Huxley, Journ. Linn. Soc.* iv. p. 20 (1860); *Günth, Rept. Brit. Ind.* p. 63 (1864); *Gray, Cat. Sh. Rept.* ii. p. 5 (1872).

Rhamphostoma, *Wagler, Syst. Amph.* p. 141 (1830).

Gavialis, part., *Strauch, Syn. Crocod.* p. 62 (1866).

Gharialis, *Theob. Cat. Rept. Brit. Ind.* p. 37 (1876).

27 to 29 upper and 25 or 26 lower teeth on each side, anterior largest, laterals subequal, not received into interdental pits; the first, second, and third mandibular fitting into notches in the upper jaw. Snout extremely narrow and elongate, dilated at the end; nasal bones comparatively short, widely separated from the præmaxillaries; nasal opening smaller than the supratemporal fossæ; lower anterior margin of orbit (jugal) raised; a very small anterior bony plate in the upper eyelid. Mandibular symphysis extremely long, extending to the 23rd or 24th tooth, comprising the splenial bones. A dorsal shield formed of four longitudinal series of juxtaposed, keeled, bony scutes; no bony ventral scutes.

India and Burma.

## 1. Gavialis gangeticus.

*Edwards, Phil. Trans.* xlix. p. 639, pl. xix. (1757).

*Lacerta gangetica*, *Gmel. S. N.* i. p. 1057 (1789).

*Crocodylus longirostris*, *Schneid. Hist. Amph.* ii. p. 160 (1801);

*Daud. Rept.* ii. p. 389 (1802); *Cuv. Ann. Mus.* x. p. 60, pl. i. figs. 2 & 10 (1807); *Blainv. Ostéogr. Rept.* (1864).

— *arctirostris*, *Daud. l. c.* p. 393.

— *tenuirostris*, *Cuv. l. c.* p. 61, pl. i. figs. 1 & 11; *Tiedem., Oppel, & Liboschitz, Nat. Amph.* p. 83, pl. xv. (1817).

— *gangeticus*, *Tiedem., Opp., & Lib. l. c.* p. 81, pl. xiv.

*Gavialis tenuirostris*, *Guérin, Icon. R. A., Rept.* pl. ii. fig. 3 (1829).

*Rhamphostoma tenuirostre*, *Wagl. Syst. Amph.* pl. vii. fig. iii. (1830).

*Gavialis gangeticus*, *Gray, Syn. Rept.* p. 56 (1831); *Dum. & Bibr.* iii. p. 134, pl. xxvi. fig. 4 (1836); *Gray, Cat. Tort. &c.* p. 57 (1844); *Günth, Rept. Brit. Ind.* p. 63 (1864); *Strauch, Syn. Crocod.* p. 63 (1866); *Gray, Cat. Sh. Rept.* ii. p. 5 (1872); *Murray, Zool. Sind.* p. 345 (1884).

*Gharialis gangeticus*, *Theob. Cat. Rept. Brit. Ind.* p. 37 (1876).

Snout thrice and one third (adult) to five and a half times (young) as long as broad at the base. Nuchal and dorsal scutes forming a single continuous shield, composed of 21 or 22 transverse series; an outer row of soft, smooth or feebly keeled scutes in addition to the bony dorsal scutes; two small postoccipital scutes. Median fingers one-third, outer toes two-thirds webbed. A strong crest on the outer edge of the forearm, leg, and foot. Scales on limbs smooth or feebly keeled. Adult dark olive above; young pale olive, with dark brown spots or cross bands.

The largest specimen in the Collection measures 5 metres.

Northern India (Systems of the Ganges and Indus, Mahanuddy River); Bombay; Aracan (Kuladan River).



|                                              |                              |                            |
|----------------------------------------------|------------------------------|----------------------------|
| <i>a, b.</i> Ad. & hgr., stffid.             | Ganges.                      | F. P. Holloway, Esq. [P.]. |
| <i>c.</i> Hgr., stffid.                      | River Jumna,<br>near Muthra. | Major Kamptie [P.].        |
| <i>d.</i> Yg., stffid.                       | Nepal.                       |                            |
| <i>e.</i> Ad., skull.                        | Nepal.                       | B. H. Hodgson, Esq. [P.].  |
| <i>f.</i> Ad., skull (without<br>lower jaw). | Poonah.                      | Dr. Leith [P.].            |
| <i>g.</i> Yg., spir.                         | India.                       | Mrs. Mauger [P.].          |
| <i>h.</i> Yg., spir.                         | India.                       |                            |
| <i>i.</i> Yg., stffid.                       | India.                       | S. P. Pratt, Esq. [P.].    |
| <i>k, l, m.</i> Yg., stffid.                 | India.                       |                            |
| <i>n.</i> Ad., skull.                        | India.                       | Capt. Oriel [P.].          |
| <i>o.</i> Ad., skull (imperfect).            | India.                       | F. Day, Esq. [P.].         |
| <i>p.</i> Hgr., skull.                       | India.                       | Dr. J. E. Gray [P.].       |
| <i>q, r, s, t.</i> Ad. & yg., skulls.        | India.                       |                            |

## 2. TOMISTOMA.

Mecistops, part., *Gray, Cat. Tort. &c.* p. 57 (1844).

Tomistoma, *S. Müller, Arch. f. Nat.* 1846, p. 122; *Gray, Cat. Sh. Rept.* ii. p. 6 (1872).

Rhynchosuchus, *Huxley, Journ. Linn. Soc.* iv. p. 16 (1860).

Gavialis, part., *Strauch, Syn. Crocod.* p. 62 (1866).

20 or 21 upper and 18 or 19 lower teeth on each side, the laterals received into interdental pits; fifth maxillary tooth largest\*; mandibular teeth, first and fourth fitting into notches in the upper jaw. Snout very narrow and elongate; nasal bones not extending to the nasal opening, but in contact with the premaxillaries; nasal opening smaller than the supratemporal fossæ; a small anterior bony plate in the upper eyelid. Mandibular symphysis very long, extending to the 14th or 15th tooth, comprising the splenial bones. A dorsal shield formed of four longitudinal series of juxtaposed, keeled, bony scutes.

Borneo.

### 1. Tomistoma schlegelii.

Crocodylus (Gavialis) schlegelii, *S. Müller, Tijdschr. v. Nat. en Physiol.* v. p. 77, pl. iii. (1838); *Schleg. & Müll. in Temminck, Verh. Nat. Nederl. Ind., Rept.* p. 18, pls. i.-iii. (1844); *Blainv. Ostéogr. Rept.* (1864).

Mecistops journei, part., *Gray, Cat. Tort. &c.* p. 58 (1844).

Rhynchosuchus schlegelii, *Huxley, Journ. Linn. Soc.* iv. p. 18 (1860).

Gavialis schlegelii, *Strauch, Syn. Crocod.* p. 62 (1860).

Tomistoma schlegelii, *Gray, Trans. Zool. Soc.* vi. p. 134 (1867), and *Cat. Sh. Rept.* ii. p. 6 (1872).

Snout thrice to thrice and a half as long as broad at the base. Nuchal and dorsal scutes forming a single continuous shield, com-

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\* The young have five teeth in each premaxilla like the Gavial and all young Crocodylians except *Caiman trigonotus* and *palpebrosus*; the second tooth disappears with age, as normally in *Crocodylus cataphractus*, *niloticus*, and *porosus*.

posed of 22 transverse series, the broadest of which contain six scutes, the four anterior (nuchals) only two; all keeled; two small postoccipital scutes. Fingers webbed at the base; outer toes extensively webbed. A strong crest on the outer edge of the leg. Scales on limbs keeled. Olive above, with dark spots or cross bands.

Reaches a length of  $4\frac{1}{2}$  metres.

Borneo.

|                     |         |                  |
|---------------------|---------|------------------|
| a. Yg., spir.       | Borneo. | Dr. Bleeker.     |
| b-c. Embryos, spir. | Borneo. | Leyden Museum.   |
| d. Ad., skull.      | Borneo. | Leyden Museum.   |
| e. Ad., skull.      | Borneo. | Mr. Mitten [C.]. |

### 3. CROCODILUS.

*Crocodylus*, part., *Laur. Syn. Rept.* p. 53 (1768); *Strauch, Syn. Crocod.* p. 28 (1866).

*Crocodylus*, *Cuvier, Ann. Mus.* x. p. 40 (1807); *Wagl. Syst. Amph.* p. 140 (1830); *Dum. & Bibr.* iii. p. 93 (1836); *Gray, Cat. Tort. &c.* p. 58 (1844); *Huxley, Journ. Linn. Soc.* iv. p. 6 (1860); *Günth. Rept. Brit. Ind.* p. 60 (1864); *Gray, Cat. Sh. Rept.* ii. p. 14 (1872).

Champse, *Merrem, Tent.* p. 36 (1820).

Mecistops, part., *Gray, Cat. Tort.* p. 57.

Opholis, *Gray, l. c.* p. 58, and *Sh. Rept.* p. 8.

Palinia, *Gray, l. cc.* pp. 60, 13.

Molinia, *Gray, l. cc.* pp. 60, 17.

Mecistops, *Huxley, l. c.* p. 15; *Gray, Cat. Sh. Rept.* p. 21.

Bombifrons, *Gray, Ann. & Mag. N. H.* (3) x. p. 269 (1862), and *Cat. Sh. Rept.* p. 9.

Temsacus, *Gray, l. cc.* pp. 272, 18.

Philas, *Gray, Proc. Zool. Soc.* 1874, p. 177.

17 to 19 upper and 15 lower teeth on each side; fifth maxillary tooth largest; the fourth mandibular usually fitting into a notch in the upper jaw. Snout more or less elongate; nasal bones extending to the nasal aperture, which is undivided and larger than the supratemporal fossæ; a very small anterior bony plate in the upper eyelid. Splenial bones not entering the mandibular symphysis, which does not extend beyond the eighth tooth. A dorsal shield formed of four or more longitudinal series of juxtaposed, keeled, bony scutes.

Africa, Southern Asia, North Australia, Tropical America.

Notwithstanding all that has been written on the specific characters of the Crocodiles, their distinction and definition remains a matter of considerable difficulty. Although the extreme forms, viz. *C. cataphractus* and *C. palustris*, differ very widely, the passage is so complete as to render even subgeneric divisions unadvisable. The following key will, I hope, suffice in most cases for the exact determination of the species, except with respect to newly born specimens, which can only be named by comparison with older examples.

*Synopsis of the Species.*

- I. Snout very slender, Gavial-like, at least twice as long as broad at the base; mandibular symphysis extending to the level of the sixth, seventh, or eighth tooth; præmaxillo-maxillary suture, on the palate, produced posteriorly.

Nuchal scutes in two longitudinal series, continuous or subcontinuous with the dorsals ..... 1. *cataphractus*, p. 279.

Nuchal scutes six, four in a square with one on each side, subcontinuous with the dorsals ..... 2. *johnstonii*, p. 279.

Nuchal scutes six, four in a square with one on each side, widely separated from the dorsals ..... 3. *intermedius*, p. 280.

- II. Snout more than once and a half, and not more than twice and one fourth, as long as broad at the base; mandibular symphysis extending to the level of the fourth or fifth tooth; præmaxillo-maxillary suture, on the palate, produced posteriorly.

A. No longitudinal ridge in front of the eye; anterior nuchal scutes (postoccipitals) well developed.

A longitudinal swelling or ridge along the middle of the snout ..... 4. *americanus*, p. 281.

A longitudinal ridge between the orbits, none on the snout ..... 5. *siamensis*, p. 282.

No ridges on the forehead or snout ..... 6. *niloticus*, p. 283.

B. A longitudinal ridge in front of the eye; anterior nuchals usually absent. 7. *porosus*, p. 284.

- III. Snout not more than once and a half as long as broad at the base; mandibular symphysis extending to the level of the fourth or fifth tooth; præmaxillo-maxillary suture, on the palate, transverse or curved forwards.

A. Snout without ridges.

Dorsal shield usually composed of four longitudinal series of scutes, the median of which are broader than long ..... 8. *palustris*, p. 285.

Dorsal shield composed of six longitudinal series of scutes in the middle ..... 9. *robustus*, p. 286.

B. A more or less distinct oblique ridge in front of the eye.

Scales on upper surface of limbs keeled .. 10. *rhombofer*, p. 287.

Scales on limbs perfectly smooth ..... 11. *moreletii*, p. 287.

1. *Crocodilus cataphractus*.

*Crocodilus cataphractus*, *Cuvier, Ossem. Foss.* v. pt. 2, p. 58, pl. v. figs. 1 & 2 (1824); *Dum. & Bibr.* iii. p. 126 (1836); *A. Dum. Arch. Mus.* x. p. 171, pl. xiv. fig. 2 (1860); *Strauch, Syn. Crocod.* pp. 60 & 106 (1866), and *Bull. Ac. St. Pétersb.* xiii. p. 58 (1869); *Giebel, Zeitschr. ges. Naturw.* l. p. 105, pls. vii.-x. (1877).  
 — *leptorhynchus*, *Bennett, Proc. Zool. Soc.* 1835, p. 129; *A. Dum. Cat. Méth. Rept.* p. 29 (1851), and *Arch. Mus.* x. p. 171, pl. xiv. fig. 1.

*Mecistops bennettii*, *Gray, Cat. Tort. &c.* p. 57 (1844).

— *cataphractus*, *Gray, l. c.* p. 58; *Huxley, Journ. Linn. Soc.* iv. p. 16 (1860); *Gray, Trans. Zool. Soc.* vi. p. 157, pl. xxxii. figs. 1-3 (1867), and *Cat. Sh. Rept.* ii. p. 22 (1872).

17 or 18 upper teeth on each side. Snout very slender, Gavial-like, twice and two thirds to thrice and one third as long as broad at the base (*i. e.* on a line with the anterior borders of the orbits), without distinct ridges; mandibular symphysis long, extending to the seventh or eighth tooth; præmaxillo-maxillary suture, on the palate, directed backwards; maxillaries forming a median suture above, behind the nasal opening. Two pairs of large nuchal scutes, continuous or subcontinuous with the dorsals, which are in 18 or 19 transverse rows, the fourth (or fifth) to fifteenth of which are composed of six scutes; sides with large, keeled scutes; gular and ventral scutes bony in the adult. A slight web between the second and third fingers; outer toes two-thirds webbed. A serrated fringe on the outer edge of the leg; scales on the limbs strongly keeled. Blackish olive above, yellowish inferiorly; young pale olive, with large black spots.

The largest specimen in the Collection measures 2 metres.

West Africa, from the Senegal to the Gaboon.

|                                       |               |                                                            |
|---------------------------------------|---------------|------------------------------------------------------------|
| <i>a.</i> Ad., stffd.                 | Gambia.       | Mr. Rendall [C.].                                          |
| <i>b.</i> Hgr., skull.                | Sierra Leone. |                                                            |
| <i>c.</i> Yg., spir.                  | Old Calabar.  | A. Murray, Esq. [P.].                                      |
| <i>d.</i> Yg., spir.                  | Old Calabar.  | W. Carruthers, Esq. [P.].                                  |
| <i>e.</i> Yg., stffd.                 | Fernando Po.  | Zoological Society. (Type<br>of <i>C. leptorhynchus</i> .) |
| <i>f, g, h.</i> Hgr. & yg.,<br>stffd. | W. Africa.    |                                                            |
| <i>i.</i> Ad., skull.                 | W. Africa.    | Dr. B. Baikie [C.].                                        |
| <i>k.</i> Ad., skull.                 | W. Africa.    |                                                            |

2. *Crocodilus johnstonii*.

*Crocodilus johnsoni* \*, *Kreffl, Proc. Zool. Soc.* 1873, p. 335.

*Philas johnstoni*, *Gray, Proc. Zool. Soc.* 1874, p. 177, pl. xxvii.

19 upper teeth on each side. Snout very slender, Gavial-like, about three times as long as broad at the base, without distinct ridges; mandibular symphysis long, extending to the sixth tooth; maxillaries forming a median suture above, behind the nasal opening.

\* A misprint for *johnstoni*.

Six large nuchal scutes, four in a square and one on each side, sub-continuous with the dorsals, which are in 19 transverse rows, the fourth to fourteenth of which are composed of six scutes; those of the two middle rows broader than long; four oval scutes in a transverse series behind the occiput. Scales on the sides and limbs keeled. Fingers nearly free, outer toes extensively webbed. A serrated fringe on the outer edge of the leg. Olive above, closely spotted with black; yellowish inferiorly.

Reaches a length of 2 metres.

North Australia.

- |                                                                                             |                                                                                    |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <p><i>a.</i> Yg., stf'd.<br/> <i>b.</i> Cast of head of type specimen, from Queensland.</p> | <p>Port Darwin. R. G. S. Buckland, Esq. [C.]<br/>         G. Krefft, Esq. [P.]</p> |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|

### 3. *Crocodilus intermedius*.

*Crocodilus intermedius*, *Graves, Ann. Gén. Sc. Phys.* ii. p. 344 (1819); *Strauch, Syn. Crocod.* p. 58 (1866); *Lütken, Vidensk. Meddel.* 1884-86, p. 61 (1886).

— *journei*, *Bory de St. Vinc. Dict. Class. d'Hist. Nat.* v. p. 111 (1824); *Dum. & Bibr.* iii. p. 129 (1836); *Huxley, Journ. Linn. Soc.* iv. p. 11 (1860); *A. Dum. Arch. Mus.* x. p. 172, pl. xiv. fig. 3 (1860).

*Mecistops journei*, part., *Gray, Cat. Tort. &c.* p. 58 (1844).

— *bathyrhynchus*, *Cope, Proc. Ac. Philad.* 1860, p. 550, and 1865, p. 185.

*Molinia intermedia*, *Gray, Ann. & Mag. N. H.* (3) x. p. 272 (1862), and *Trans. Zool. Soc.* vi. p. 151, figs., pl. xxxii. figs. 4-6 (1867), and *Cat. Sh. Rept.* ii. p. 18 (1872).

18 or 19 upper teeth on each side. Snout very slender, twice to twice and a half as long as broad at the base, without distinct ridges: mandibular symphysis long, extending to the sixth tooth; præmaxillo-maxillary suture, on the palate, produced backwards; maxillaries usually forming a median suture above, behind the nasal opening. Six large nuchal scutes, four in a square and one on each side, widely separated from the dorsals; four postoccipital scutes in a transverse series; dorsal scutes in 16 transverse series, the broadest of which contain six scutes in an uninterrupted series; other large keeled scutes isolated on the sides. Scales on the limbs keeled; a serrated fringe on the outer edge of the leg. A short web between the second and third fingers; outer toes extensively webbed. Olive above, yellowish inferiorly.

The largest known specimen measures nearly 4 metres.

Orinoco.

- |                                                                                   |                                                   |
|-----------------------------------------------------------------------------------|---------------------------------------------------|
| <p><i>a.</i> Ad., skull.<br/> <i>b.</i> Ad., skull.<br/> <i>c.</i> Yg., spir.</p> | <p>Orinoco.<br/>         — ?<br/>         — ?</p> |
|-----------------------------------------------------------------------------------|---------------------------------------------------|



4. *Crocodilus americanus*.

*Schneid. Hist. Amph.* ii. p. 23 (1801); *Geoffr. Ann. Mus.* ii. pl. xxxvii. fig. 1 (1803).

*Crocodilus americanus*, *Laur. Syn. Rept.* p. 54 (1768); *Gray, Cat. Tort. &c.* p. 60 (1844); *Huxley, Journ. Linn. Soc.* iv. p. 11 (1860); *Bocourt, Miss. Sc. Mex., Rept.* p. 30, pl. viii. fig. 1, & pl. ix. fig. 1 (1870); *Günth. Biol. C.-Am., Rept.* p. 19 (1885).

— *acutus*, *Cuv. Ann. Mus.* x. p. 55, pls. i. & ii. (1807); *Geoffr. Ann. Mus.* x. p. 70 (1807); *Tiedem., Opp., & Lib. Nat. Amph.* p. 78, pl. xiii. (1817); *Dum. & Bibr.* iii. p. 119 (1836); *Coct. in R. de la Sagra, Hist. Cuba, Rept.* p. 62, pl. v. (1843); *Strauch, Syn. Crocod.* pp. 56 & 102 (1866); *Wyman, Amer. Journ.* xlix. p. 105 (1870).

— *biscutatus*, *Cuv. l. c.* p. 53, pl. ii. fig. 6; *Tiedem., Opp., & Lib.*

*op. cit.* p. 77, pl. xii.

*Molinia americana*, *Gray, Ann. & Mag. N. H.* (3) x. p. 272 (1862), and *Trans. Zool. Soc.* vi. p. 150 (1867), and *Cat. Sh. Rept.* ii. p. 17 (1872).

*Crocodilus pacificus*, *Bocourt, l. c.* p. 31, pl. ix. fig. 5.

— *lewyanus*, *Bocourt, l. c.* p. 33, pl. viii. fig. 2.

— *mexicanus*, *Bocourt, l. c.* p. 34, pl. viii. fig. 3.

18 or 19 upper teeth on each side. Snout variable in length, once and three fifths to twice and one fourth as long as broad at the base; a median ridge or longitudinal swelling along the snout; mandibular symphysis extending to the fourth or fifth tooth; præmaxillo-maxillary suture, on the palate, directed backwards; maxillaries forming a short median suture above, or narrowly separated by the nasals. Usually four large nuchals forming a square, with a smaller one on each side of the anterior pair; the large nuchals sometimes followed by one or two detached pairs of smaller scutes; usually two pairs of smaller nuchals in a transverse row behind the occiput. Dorsal scutes well separated from the nuchals, in 15 or 16 transverse and four or six longitudinal rows; the scutes of the two median rows regularly arranged, the others more or less irregular and more strongly keeled; sides with scattered keeled scutes. A slight web between the second and third fingers; outer toes extensively webbed. A serrated fringe on the outer edge of the leg; scales on the limbs keeled. Blackish olive above, yellowish inferiorly; young pale olive, dotted and spotted with black.

The largest specimen in the Collection measures  $3\frac{1}{2}$  metres.

Ecuador, Colombia, Venezuela, Central America, West Indies, Florida.

|                   |                        |                            |
|-------------------|------------------------|----------------------------|
| a. Yg., spir.     | W. Ecuador.            | Mr. Fraser [C.].           |
| b. Yg., skin.     | Chepo, Panama.         | O. Salvin, Esq. [C.].      |
| c. Ad., stfild.   | San Juan de Nicaragua. | G. R. Williams, Esq. [P.]. |
| d. Yg., spir.     | Nicaragua.             | Sir J. Richardson [P.].    |
| e. Hgr., stfild.  | Guatemala.             | O. Salvin, Esq. [C.].      |
| f. Yg., stfild.   | Tapana, Tehuantepec.   | F. Sumichrast [C.].        |
| g. Yg., spir.     | Mazatlan.              | Mr. Forrer [C.].           |
| h, i. Yg., skins. | Presidio.              | Mr. Forrer [C.].           |

|                                                     |                      |                              |
|-----------------------------------------------------|----------------------|------------------------------|
| <i>k.</i> Ad., skull.                               | W. coast of America. | Sir E. Belcher [P.].         |
| <i>l, m, n, o, p.</i> Ad. & yg.,<br>stfdd. & skins. | Mexico.              |                              |
| <i>q.</i> Ad., skull.                               | Mexico.              |                              |
| <i>r.</i> Ad., stfdd.                               | Jamaica.             |                              |
| <i>s, t.</i> Yg., spir.                             | Jamaica.             | F. Beckford, Esq. [P.].      |
| <i>u-v.</i> Yg., spir.                              | Cuba.                | W. S. Macleay, Esq.<br>[P.]. |
| <i>v.</i> Hgr., stfdd.                              | Tropical America.    | Sir J. Richardson [P.].      |
| <i>x-y.</i> Yg., spir.                              | Tropical America.    | J. Goodridge, Esq. [P.].     |
| <i>z, a, β, γ.</i> Hgr. & yg.,<br>stfdd.            | — ?                  |                              |
| <i>δ.</i> Ad., skel.                                | — ?                  |                              |
| <i>ε, ζ.</i> Yg., skulls.                           | — ?                  |                              |

### 5. *Crocodylus siamensis*.

*Crocodylus siamensis*, *Schneid. Hist. Amph.* ii. p. 157 (1801); *Günth. Rept. Brit. Ind.* p. 61, pl. viii. fig. B (1864); *Strauch, Syn. Crocod.* p. 50 (1866).

— *galeatus*, *Cuv. Ann. Mus.* x. p. 51, pl. i. fig. 9 (1807); *Tiedem., Opp., & Lib. Nat. Amph.* p. 76, pl. xi. (1817); *Dum. & Bibr.* iii. p. 113 (1836).

— *vulgaris*, *Schleg. & Müll. in Temminck, Ver. Nat. Gesch. Nederl. Ind., Rept.* p. 28, pl. iii. fig. 9 (1844).

*Bombifrons siamensis*, *Gray, Ann. & Mag. N. H.* (3) x. p. 269 (1862).

— *siamensis*, part., *Gray, Tr. Zool. Soc.* vi. p. 144 (1867), and *Cat. Sh. Rept.* ii. p. 13 (1872).

18 upper and 15 lower teeth on each side. Snout once and three fourths as long as broad at the base, rough but without any distinct ridges; interorbital space broad, with a median longitudinal ridge (which, in the specimen figured by Cuvier, is developed into a strong crest followed by another on the occiput); mandibular symphysis extending to the fourth tooth; præmaxillo-maxillary suture, on the palate, directed backwards; præmaxillaries narrowly separated above by the nasals. Four large nuchals forming a square, with a smaller one on each side; two pairs of smaller nuchals in a transverse series behind the occiput. Dorsal scutes well separated from the nuchals, in 16 transverse and four or six longitudinal rows, equally strongly keeled; one or two longitudinal series of smaller scutes in addition on each side. Fingers slightly, outer toes extensively webbed. A serrated fringe on the outer edge of the leg; scales on the limbs strongly keeled. Dark olive above, spotted with black.

The half-grown specimen in the Collection measures 1 metre 38 centim.

Siam, Camboja, Java.

|                        |          |                 |
|------------------------|----------|-----------------|
| <i>a.</i> Hgr., stfdd. | Camboja. | M. Mouhot [C.]. |
|------------------------|----------|-----------------|

6. *Crocodilus niloticus*.

- Lacerta crocodilus*, part., *Linn. S. N.* i. p. 359 (1766).  
*Crocodilus niloticus*, *Laur. Syn. Rept.* p. 53 (1768); *Daud. Rept.* ii. p. 367 (1802).  
 ? *Crocodilus africanus*, *Laur. l. c.* p. 54.  
*Crocodilus vulgaris*, *Cuv. Ann. Mus.* x. p. 40, pls. i. & ii. (1807); *Geoffr. t. c.* p. 82, pl. iii., and *Descr. Egypte*, i. p. 185, pl. ii. (1829); *Tiedem., Opp., & Lib. Nat. Amph.* p. 68, pl. viii. (1817); *Gray, Cat. Tort. &c.* p. 61 (1844); *Huxley, Journ. Linn. Soc.* iv. p. 6 (1860); *Strauch, Syn. Crocod.* pp. 43 & 90 (1866); *Gray, Trans. Zool. Soc.* vi. p. 147, figs. (1867), and *Cat. Sh. Rept.* ii. p. 15 (1872); *Boettg. Ber. Senck. Ges.* 1879-80, p. 199 (1880); *Peters, Reise n. Mossamb.* iii. p. 19, pl. iv. fig. 1 (1882).  
 — suchus, *Geoffr. ll. cc.* pp. 84, 243.  
 — chamsees, *Bory de St. Vinc. Dict. Class. d'Hist. Nat.* v. p. 105 (1824).  
 — marginatus, *Geoffr. Descr. Egypte*, p. 260; *Gray, Cat. Tort. &c.* p. 61.  
 — lacunosus, *Geoffr. l. c.* p. 261.  
 — complanatus, *Geoffr. l. c.* p. 263.  
 — vulgaris, part., *Dum. & Bibr.* iii. p. 104 (1836).  
 — binuensis, *Baikie, Proc. Zool. Soc.* 1857, p. 48.  
 — madagascariensis, *Grandid. Ann. Sc. Nat.* xv. art. 20 (1872); *Gray, Proc. Zool. Soc.* 1874, p. 145, pl. xxiii.; *Boettg. Abh. Senck. Ges.* xi. p. 27, pl. —. fig. 6 (1877), and xii. p. 486 (1881).

18 or 19 upper and 15 lower teeth on each side. Snout variable in length, once and two thirds to twice as long as broad at the base; head rough above, but without any marked ridges; mandibular symphysis extending to the fourth or fifth tooth; præmaxillo-maxillary suture, on the palate, directed backwards or W-shaped; nasal bones separating the præmaxillaries above. Four large nuchals forming a square, usually with a smaller one on each side, sometimes followed by other smaller nuchals and thus subcontinuous with the dorsal shield; four or six nuchals in a transverse series behind the occiput. Dorsal scutes in 16 or 17 transverse and six or eight longitudinal series; sides with scattered smaller scutes. Fingers webbed at the base; outer toes extensively webbed. A serrated fringe on the outer edge of the leg; scales on the limbs feebly keeled or smooth. Adult dark olive above; young pale olive, speckled or vermiculate with black, and with scattered large black spots.

The largest specimen in the Collection measures  $4\frac{1}{2}$  metres.

Africa, from the Nile and the Senegal to the Cape of Good Hope; Syria; Madagascar.

|                                                   |               |                        |
|---------------------------------------------------|---------------|------------------------|
| a. Ad., stffid.                                   | Egypt.        |                        |
| b. Yg., stffid.,                                  | Egypt.        | Sir J. Wilkinson [P.]. |
| c. Yg., spir.                                     | Egypt.        |                        |
| d-e. Yg., mummies, from tombs.                    | Egypt.        |                        |
| f, g, h, i, k, l, m, n. Ad., hgr., & yg., stffid. | Egypt?        |                        |
| o. Ad., stffid.                                   | Kenneh, Nile. | W. Gilbey, Esq. [P.].  |

|                                 |                        |                                |
|---------------------------------|------------------------|--------------------------------|
| <i>p.</i> Hgr., stffd.          | Nile.                  | G. L. Conyngham,<br>Esq. [P.]. |
| <i>q.</i> Ad., skel.            | Abyssinia.             |                                |
| <i>r.</i> Ad., stffd.           | Senegal.               |                                |
| <i>s-t.</i> Yg., spir.          | Senegal.               |                                |
| <i>u.</i> Ad., stffd.           | Niger.                 | Dr. B. Baikie [C.].            |
| <i>v.</i> Yg., spir.            | Old Calabar.           | A. Murray, Esq. [P.].          |
| <i>w.</i> Ad., skull.           | Old Calabar.           | A. Murray, Esq. [P.].          |
| <i>x, y, z.</i> Ad., skulls.    | W. Africa.             | Dr. B. Baikie [C.].            |
| <i>a.</i> Hgr., skull.          | W. Africa.             | Dr. Livingstone [P.].          |
| <i>β.</i> Yg., head in spir.    | Pongo Andongo, Angola. | Dr. Welwitsch [P.].            |
| <i>γ.</i> Yg., spir.            | Tette, Mozambique.     | Sir J. Kirk [P.].              |
| <i>δ.</i> Yg., spir.            | Natal.                 |                                |
| <i>ε.</i> Ad., stffd.           | S. Africa.             | Lord Derby [P.].               |
| <i>ζ, η.</i> Hgr. & yg., stffd. | Madagascar.            |                                |
| <i>θ.</i> Yg., spir.            | Madagascar.            |                                |
| <i>ι.</i> Hgr., skel.           | Madagascar.            |                                |
| <i>κ.</i> Yg., spir.            | E. Madagascar.         |                                |
| <i>λ, μ.</i> Yg., stffd.        | — ?                    |                                |

### 7. *Crocodilus porosus*.

*Crocodilus porosus*, *Schneid. Hist. Amph.* ii. p. 159 (1801); *Gray, Cat. Tort. &c.* p. 58 (1844); *Günth. Rept. Brit. Ind.* p. 62 (1864); *Theob. Cat. Rept. Brit. Ind.* p. 36 (1876).

— *oopholis*, *Schneid. l. c.* p. 165.

— *biporcatus*, *Cuv. Ann. Mus.* x. p. 48, pls. i. & ii. (1807); *Tiedem., Opp., & Lib. Nat. Amph.* p. 72, pl. ix. (1817); *Lesson, in Bélang. Voy. Ind. Or., Zool.* p. 303 (1834); *Dum. & Bibr.* iii. p. 115 (1836); *Schleg. Abbild.* p. 3, pl. i. (1837); *Huxley, Journ. Linn. Soc.* iv. p. 11 (1860); *Strauch, Syn. Crocod.* pp. 52 & 99 (1866).

— *biporcatus raninus*, *Schleg. & Müll. in Temminck, Verh. Nat. Gesch. Nederl. Ind., Rept.* p. 28, pl. iii. figs. 7 & 8 (1844).

*Oopholis porosus*, *Gray, Ann. & Mag. N. H.* (3) x. p. 267 (1862), and *Trans. Zool. Soc.* vi. p. 138 (1867), and *Cat. Sh. Rept.* ii. p. 8 (1872).

— *pondicerianus*, *Gray, ll. cc.* pp. 268, 139, 9.

*Crocodilus pondicerianus*, *Günth. Rept. Brit. Ind.* p. 62, pl. vii.; *Stoliczka, Journ. As. Soc. Beng.* xlii. p. 113 (1873); *Theob. l. c.*

17 to 19 upper teeth on each side. Snout once and two thirds to twice and one fourth as long as broad at the base; head rough, snout with a more or less strong ridge on each side in front of the eye, slightly converging towards its fellow; mandibular symphysis extending to the fifth tooth; præmaxillo-maxillary suture, on the palate, directed backwards or W-shaped; nasal bones separating the præmaxillaries above. Four large nuchals forming a square, with one or two smaller ones on each side; postoccipital scutes usually absent, sometimes small and irregular. Dorsal shield well separated from the nuchal, the scutes forming 16 or 17 transverse and four to eight longitudinal series; scales on sides and limbs smooth or feebly keeled. Fingers webbed at the base; outer toes extensively webbed. A serrated fringe on the outer edge of the leg. Adult dark olive

above; young pale olive, with large black spots on the body and tail and dots on the head.

The largest specimen in the Collection measures  $5\frac{1}{4}$  metres.

India and Ceylon and Southern China to North Australia and the Solomon and Fiji Islands. Entering salt water and frequently occurring out at sea.

|                                     |                            |                                     |
|-------------------------------------|----------------------------|-------------------------------------|
| <i>a.</i> Yg., stffd.               | India.                     | Gen. Hardwicke [P.].                |
| <i>b.</i> Hgr., stffd.              | India.                     | Capt. Ince [P.].                    |
| <i>c, d.</i> Ad. & yg., stffd.      | India.                     |                                     |
| <i>e.</i> Ad., skull.               | India.                     | Dr. Falconer [P.].                  |
| <i>f, g, h.</i> Ad., skulls.        | India.                     |                                     |
| <i>i.</i> Ad., skull.*              | Bawisaul, Bengal (1840).   | Gilson Rowe, Esq. [P.].             |
| <i>k.</i> Yg., spir.                | Pondichery.                | (Type of <i>C. pondicerianus</i> .) |
| <i>l.</i> Yg., spir.                | Ceylon.                    | W. Ferguson, Esq. [P.].             |
| <i>m.</i> Ad., skull.               | Trincomalee.               |                                     |
| <i>n.</i> Yg., spir.                | S. China.                  |                                     |
| <i>o.</i> Yg., spir.                | Siam.                      | Sir R. Schomburgk [P.].             |
| <i>p.</i> Yg., spir.                | Coast of Tenasserim.       | Dr. Packman [P.].                   |
| <i>q.</i> Many specs., yg., spir.   | Singapore.                 | Governor of Singapore [P.].         |
| <i>r-s.</i> Yg., spir.              | Java.                      | Mrs. Lyon [P.].                     |
| <i>t.</i> Yg., spir.                | Borneo.                    | Sir E. Belcher [P.].                |
| <i>u.</i> Yg., spir.                | Borneo.                    | Sir H. Lowe [C.].                   |
| <i>v.</i> Ad., skull.               | Borneo.                    |                                     |
| <i>w.</i> Yg., spir.                | Labuan.                    | Haslar Hospital.                    |
| <i>x.</i> Yg., spir.                | Placer, N.E. Mindanao.     | A. Everett, Esq. [C.].              |
| <i>y.</i> Yg., spir.                | Manado, Celebes.           | Dr. A. B. Meyer [C.].               |
| <i>z.</i> Yg., spir.                | Gorontalo.                 | Dr. A. B. Meyer [C.].               |
| <i>a, β, γ.</i> Hgr. & yg., skulls. | Fly R., New Guinea.        | Rev. S. Macfarlane [C.].            |
| <i>δ.</i> Hgr., skull.              | Guadalcanar, Solomon Ids.  | H. B. Guppy, Esq. [P.].             |
| <i>ε.</i> Ad., skull.               | Treasury Id., Solomon Ids. | H. B. Guppy, Esq. [P.].             |
| <i>ζ.</i> Ad., stffd.               | N. Australia.              |                                     |
| <i>η.</i> Yg., stffd.               | N. Australia.              | Dr. J. Elsey [C.].                  |
| <i>θ.</i> Ad., skull.               | N. Australia.              | Capt. Stokes [P.].                  |
| <i>ι.</i> Yg., spir.                | N.E. Australia.            |                                     |

### 8. *Crocodilus palustris*.

*Crocodilus palustris*, Lesson in *Bélang. Voy. Ind. Or., Zool.* p. 305 (1834); *Kelaart, Prodr. Faun. Zeyl.* p. 183 (1852); *Günth. Rept. Brit. Ind.* p. 61, pl. vii. fig. A (1864); *Strauch, Syn. Crocod.* pp. 48 & 97 (1866); *Theob. Cat. Rept. Brit. Ind.* p. 36 (1876).

— *vulgaris*, var. B, *Dum. & Bibr.* iii. p. 108 (1836); *Cantor, Cat. Mal. Rept.* p. 15 (1847).

— *palustris*, part., *Gray, Cat. Tort. &c.* p. 62 (1844).

— *trigonops*, *Gray, l. c.*

\* Stated by the donor to have pertained to a specimen 33 feet long and measuring 13 feet 8 inches round the body.



*Crocodylus bombifrons*, Gray, *Cat. Tort.* p. 59 (1844); *Huxley, Journ. Linn. Soc.* iv. p. 13 (1860).  
*Bombifrons trigonops*, Gray, *Ann. & Mag. N. H.* (3) x. p. 269 (1862).  
 — *indicus*, Gray, *Trans. Zool. Soc.* vi. p. 140, figs., pl. xxxi. figs. 1-3 (1867), and *Cat. Sh. Rept.* ii. p. 9 (1872).

19 upper teeth on each side. Snout once and one third to once and a half as long as broad at the base; head rough but without any ridges; mandibular symphysis extending to the level of the fourth or fifth tooth; præmaxillo-maxillary suture, on the palate, transverse, nearly straight, or curved forwards; nasal bones separating the præmaxillaries above. Four large nuchals forming a square, with a smaller one on each side; two pairs of smaller nuchals on a transverse series behind the occiput. Dorsal shield well separated from the nuchal, the scutes usually in four, rarely in six, longitudinal series, those of the two median usually considerably broader than long; 16 or 17 transverse series. Scales on limbs keeled. Fingers webbed at the base; outer toes extensively webbed. A serrated fringe on the outer edge of the leg. Adult blackish olive above, young pale olive, dotted and spotted with black.

The largest specimen in the Collection measures 3 metres.

India, Ceylon, Burma, Malay Peninsula and Archipelago.

|                   |                           |                                                                 |
|-------------------|---------------------------|-----------------------------------------------------------------|
| a. Ad., stfïd.    | River Jumna, near Muthra. | Major Kamptie [P.].                                             |
| b. Hgr., stfïd.   | River Raptée.             |                                                                 |
| c. Yg., stfïd.    | Ganges.                   | Dr. Sayer [P.].                                                 |
| d. Yg., stfïd.    | Madras.                   |                                                                 |
| e. Yg., stfïd.    | India.                    | Gen. Hardwicke [P.]. (Type of <i>C. trigonops</i> .)            |
| f. Yg., stfïd.    | India.                    | Gen. Hardwicke [P.].                                            |
| g. Ad., skull.    | India.                    | Capt. Oriël [P.].                                               |
| h. Ad., skull.    | India.                    | Mus. Asiat. Soc. } (Types of <i>C. bombifrons</i> .)<br>Bengal. |
| i. Ad., skull.    | India.                    | W. Theobald, Esq. [C.].                                         |
| k. Hgr., skull.   | India.                    | Sir J. E. Boileau [P.].                                         |
| l. Ad., skull.    | India.                    |                                                                 |
| m. Hgr., skull.   | Ceylon.                   | Dr. Kelaart [P.].                                               |
| n. Yg., stfïd.    | Singapore.                |                                                                 |
| o, p. Yg., stfïd. | —?                        |                                                                 |

### 9. *Crocodylus robustus*.

*Crocodylus robustus*, *Vaill. & Grand. C. R. Ac. Sc.* lxxv. p. 150 (1872); *Vaill. C. R. Ac. Sc.* xcvii. p. 1081 (1883).

19 upper teeth on each side. Habit stout. Snout short, obtuse; præmaxillo-maxillary suture, on the palate, transverse, rectilinear. Four anterior nuchal scutes in a transverse series; a nuchal shield composed of six scutes on two rows, well separated from the dorsal shield; latter composed of six scutes in a transverse row on the middle of the body. Outer toes webbed to the claw. Cnemial fringe present.

Reaches a length of 10 metres.

Interior of Madagascar.

10. *Crocodilus rhombifer*.

*Crocodilus rhombifer*, *Cuv. Ann. Mus.* x. p. 51 (1807), and *Oss. Foss.* v. pt. 2, pl. iii. figs. 1-4 (1824); *Tiedem., Opp., & Lib. Nat. Amph.* p. 75, pl. x. (1817); *Wiegman. Herp. Mex.* p. 22 (1834); *Dum. & Bibr.* iii. p. 97 (1836); *Coct. in R. de la Sagra, Hist. Cuba, Rept.* p. 55, pl. iv. (1843); *Gray, Cat. Tort. &c.* p. 60 (1844); *Blainv. Ostéogr. Rept.* (1864); *Strauch, Syn. Crocod.* pp. 41 & 88 (1866); *Bocourt, Miss. Sc. Mex., Rept.* p. 35, pl. ix. fig. 4 (1870).  
*Palinia rhombifer*, part., *Gray, Ann. & Mag. N. H.* (3) x. p. 270 (1862), and *Cat. Sh. Rept.* ii. p. 13 (1872).

18 or 19 upper teeth on each side. Snout not more than once and a half as long as broad at the base; a more or less marked obtuse oblique ridge in front of each eye, forming with the inner borders of the orbits a rhomb with the anterior and posterior angles cut off; mandibular symphysis extending to the level of the fourth or fifth tooth; præmaxillo-maxillary suture, on the palate, nearly straight, transverse; nasal bones separating the præmaxillaries above. Six or eight large nuchals on two transverse series, and two pairs of smaller ones on a transverse series behind the occiput. Dorsal shield well separated from the nuchal, formed of four or six longitudinal and 16 transverse series; sides with large keeled scutes. Scales on limbs strongly keeled. Fingers webbed at the base; outer toes half-webbed. Chemical crest feebly developed. Olive above, spotted with black.

Total length 1 metre 60 centim.

Cuba; Mexico?

|                        |       |                         |       |
|------------------------|-------|-------------------------|-------|
| <i>a.</i> Ad., stfild. | Cuba. | M. R. de la Sagra [C.]. | Paris |
| <i>b.</i> Yg., spir.   | ——?   | Museum [L.].            |       |

11. *Crocodilus moreletii*.

*Crocodilus moreletii*, *A. Dum. Cat. Méth. Rept.* p. 28 (1851), and *Arch. Mus.* vi. p. 255, pl. xx. (1852); *Strauch, Syn. Crocod.* p. 42 (1866); *Bocourt, Miss. Sc. Mex., Rept.* p. 37, pl. ix. fig. 2 (1870).  
*Palinia?* *moreletii*, *Gray, Ann. & Mag. N. H.* (3) x. p. 271 (1862), and *Cat. Sh. Rept.* ii. p. 14 (1872).  
*Alligator lacordairei*, *P. de Borre, Bull. Ac. Bely.* (2) xxviii. p. 110, pl. — (1869).

Appears to be very closely allied to *C. rhombifer*, from which it differs in the scales of the flanks and upper surface of limbs being flat and smooth.

Guatemala and Honduras.

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The following species, established upon a single specimen of unknown origin, remains doubtful:—

*CROCODYLUS PLANIROSTRIS*, *Graves, Ann. Gén. Sc. Phys.* ii. p. 348 (1819).

*Crocodylus gravesii*, *Bory de St. Vinc. Dict. Class. d'Hist. Nat.* v. p. 109 (1824); *Dum. & Bibr.* iii. p. 101 (1836).

Habit remarkably stout. Snout short, perfectly flat above, without ridges. Four anterior nuchals on a transverse series and six posterior on two transverse series. Dorsal scutes in six longitudinal and 18 transverse series, with very strong, tubercular or recurved keels; lateral scales obtusely keeled. Scales on upper surface of limbs keeled, tubercular. Toes entirely webbed. No enmial crest.

#### 4. OSTEOLÆMUS.

*Osteolæmus*, *Cope, Proc. Ac. Philad.* 1860, p. 549 (1861).

*Halerosia*, *Gray, Ann. & Mag. N. H.* (3) x. p. 273 (1862), and *Cat. Sh. Rept.* ii. p. 19 (1872).

*Crocodylus*, part., *Strauch, Syn. Crocod.* p. 28 (1866).

16 or 17 upper and 14 or 15 lower teeth on each side; fifth maxillary tooth longest; fourth mandibular tooth fitting into a notch in the upper jaw. Snout rather short; nasal bones forming a septum dividing the nasal aperture; supratemporal fossæ very small; a bony plate occupying the greater part of the upper eyelid. Splenial bones not entering the mandibular symphysis, which extends to the fourth or fifth tooth. A dorsal shield formed of four or six longitudinal series of juxtaposed, keeled, bony scutes; gular and ventral scutes bony, not articulating together.

West Africa.

##### 1. *Osteolæmus tetraspis*.

*Osteolæmus tetraspis*, *Cope, l. c.* p. 550, and *Proc. Ac. Philad.* 1867, p. 209, and *Tr. Am. Phil. Soc.* (2) xiv. p. 85, fig. (1870).

*Crocodylus frontatus*, *A. Murray, Proc. Zool. Soc.* 1862, p. 213, pl. xxix.; *A. Dum. N. Arch. Mus.* i. *Bull.* p. 33 (1864); *Strauch, l. c.* pp. 37 & 84, pl. —, and *Bull. Ac. St. Pétersb.* xiii. p. 51 (1869).

*Halerosia frontata*, *Gray, Ann. & Mag. N. H.* (3) x. p. 273 (1862).

— *nigra*, *Gray, Trans. Zool. Soc.* vi. p. 153, pl. xxxi. figs. 1-6 (1867), and *Cat. Sh. Rept.* ii. p. 20 (1872).

— *afzelii*, *Lilljeborg, Proc. Zool. Soc.* 1867, p. 715, figs.

Head once and a half to once and two thirds as long as broad; snout obtuse, its length exceeding a little its basal width; upper surface deeply honeycombed, without ridges; interorbital space deeply concave, narrow. Nuchal shield distinct from the dorsal, composed of two or three pairs of strongly keeled scutes, the anterior of which are very large; anterior part of nape with small, scattered, keeled bony tubercles, the largest of which may form a transverse series. 17 transverse series of dorsal scutes, the broadest composed of six scutes; keels very feeble on the two median series,

stronger on the others. Fingers with a rudiment of web ; outer toes hardly half-webbed. Scales on upper surface of limbs keeled ; no cnemial crest. Adult uniform blackish ; young yellowish brown above, profusely dotted and spotted with black, and with broad black cross bands on the body and tail ; ventral shields black and yellow.

Total length 1 metre 70 centim.

Sierra Leone to Ogowai.

|                                                  |              |                                                         |
|--------------------------------------------------|--------------|---------------------------------------------------------|
| a. Yg., spir.                                    | Old Calabar. | A. Murray, Esq. [P.]<br>(Type of <i>C. frontatus</i> .) |
| b, c. Ad. & hgr., skulls,<br>without lower jaws. | Old Calabar. | A. Murray, Esq. [P.]                                    |
| d. Hgr., stffd.                                  | River Bonny. | Dr. Forsyth [P.]                                        |
| e. Ad., stffd.                                   | W. Africa.   |                                                         |
| f, g. Hgr. & yg., spir.                          | W. Africa.   |                                                         |
| h. Yg., skel.                                    | W. Africa.   |                                                         |

## 5. ALLIGATOR.

Alligator, part., *Cuvier, Ann. Mus.* x. p. 30 (1807) ; *Dum. & Bibr.* iii. p. 63 (1836) ; *Strauch, Syn. Crocod.* p. 9 (1866).

Champsä, part., *Wagler, Syst. Amph.* p. 140 (1830).

Alligator, *Gray, Cat. Tort. &c.* p. 66 (1844) ; *Huxley, Journ. Linn. Soc.* iv. p. 3 (1860) ; *Gray, Cat. Sh. Rept.* ii. p. 28 (1872).

17 to 20 upper and 18 to 20 lower teeth on each side ; fourth maxillary tooth longest ; fourth mandibular tooth fitting into a pit in the upper jaw. Snout rather short ; nasal bones forming a septum dividing the nasal aperture ; supratemporal fossæ small. Splenial bones not entering the mandibular symphysis, which extends to the fourth tooth. A dorsal shield formed of six or eight longitudinal series of juxtaposed, keeled, bony scutes ; gular and ventral scutes without or with thin ossifications.

North America and China.

### *Synopsis of the Species.*

The broadest transverse series of dorsal scutes composed of 8 scutes ; four large nuchal scutes ; upper eyelid bony anteriorly ; fingers webbed ; end of tail strongly compressed and crested . . . . 1. *mississippiensis*, p. 290.

The broadest transverse series of dorsal scutes composed of 8 scutes ; two large nuchal scutes ; fingers free ; end of tail little serrate above, scarcely compressed 2. *helois*, p. 290.

The broadest transverse series of dorsal scutes composed of 6 scutes ; six large nuchal scutes ; upper eyelid entirely bony ; fingers free ; end of tail strongly compressed and crested . . . . . 3. *sinensis*, p. 291.

1. *Alligator mississippiensis*.

- Crocodylus mississippiensis*, *Daud. Rept.* ii. p. 412 (1802).  
 — *lucius*, *Cuv. Ann. Mus.* x. p. 32 (1807), and *Oss. Foss.* v. pt. ii. p. 32, pls. i. & ii. (1824); *Tiedem., Opp., & Lib. Nat. Amph.* p. 58, pl. iv (1817); *Harlan, Med. Zool. Res.* p. 146 (1835).  
 — *cuvieri*, *Leach, Zool. Misc.* ii. p. 117, pl. cii. (1815).  
*Alligator lucius*, *Bory de St. Vinc. Dict. Class. d'H. N.* v. p. 100 (1824); *Dum. & Bibr.* iii. p. 75, pls. xxv. & xxvi. (1836).  
 — *cuvieri*, *Bory de St. Vinc. l. c.* p. 104.  
 — *mississippiensis*, *Gray, Syn. Rept.* p. 62 (1831); *Holbr. N. Am. Herp.* ii. p. 53, pl. vi. (1842); *Gray, Cat. Tort. &c.* p. 66 (1844); *Strauch, Syn. Crocod.* pp. 15 & 66 (1866); *Gray, Trans. Zool. Soc.* vi. p. 168 (1869), and *Cat. Sh. Rept.* ii. p. 29 (1872); *Chaffanjon, Ann. Soc. Linn. Lyon*, xxviii. p. 83 (1882).

19 or 20 upper and as many lower teeth on each side. Head nearly twice as long as broad; snout much depressed, broadly rounded at the end, with the lateral outline nearly straight; a very short ridge in front of the orbit; upper eyelid bony anteriorly. Two pairs of large nuchal scutes, forming a square, separated on the median line, with a pair of small ones in front and another pair behind. 17 or 18 transverse series of dorsal scutes, the broadest composed of 8 scutes. Fingers hardly half-webbed, outer toes about two-thirds webbed. Tail strongly compressed and crested posteriorly. Dark green or blackish above, young with yellowish cross-bands; lower parts yellowish.

Total length 2 metres 20 centim.; reaches a length of  $4\frac{1}{2}$  metres.

South-eastern United States, from the mouth of the Rio Grande to North Carolina.

|                                             |                                |                                                       |
|---------------------------------------------|--------------------------------|-------------------------------------------------------|
| a. Hgr., stffid.                            | Dauphin Island,<br>Mobile Bay. | Major De Bathe [P.].<br>(Type of <i>C. cuvieri</i> ). |
| b. Yg., spir.                               | New Orleans.                   |                                                       |
| c-d. Yg., spir.                             | N. America.                    | Lord Ampthill [P.].                                   |
| e. Yg., stffid.                             | N. America.                    | E. Doubleday, Esq. [P.].                              |
| f, g, h, i, k. Ad.,<br>hgr., & yg., stffid. | N. America.                    |                                                       |
| l, m, n, o. Hgr. &<br>yg., skels.           | N. America.                    |                                                       |
| p. Ad., skull.                              | N. America.                    |                                                       |
| q. Ad., skull.                              | N. America.                    | Dr. Falconer [P.].                                    |

2. *Alligator helois*.

*Alligator helois*, *Cope, Proc. Ac. Philad.* 1865, p. 185.

Two keels behind and between the eyes, diverging posteriorly; a short and nearly transverse keel in front of the eyes. Two oblique rows of elevated horn-like scutes on each side of the neck, of rather small size, four in the inner, three in the outer row, the third of the inner and the second of the outer forming, with two large elevated median scutes, a transverse row. Eight longitudinal rows of dorsal scutes



on the middle of the body. Each ventral shield with a thin ossification. Fingers free. End of tail little serrate above, scarcely compressed. Colour dark brown, with vertical yellow bars on the sides and tail, the former very irregular; chin, throat, and lips yellow, without spots.

Total length 1 metre 30 centim.

*Hab.* — ?

### 3. Alligator sinensis.

*Alligator sinensis*, *Fauvel, Journ. N. China Br. As. Soc.* xiii. p. 1, pl. — (1879); *Vaillant, Ann. Sc. Nat.* (6) ix. art. 8 (1880); *Boettger, Ber. Offenb. Ver. Naturk.* 1888, p. 111.

17 or 18 upper and 18 or 19 lower teeth on each side. Head nearly once and a half as long as broad; lateral outlines of snout converging towards the end, which is obtusely rounded; upper eyelid entirely bony. Three pairs of large nuchal scutes, in contact on the median line; two small, round, isolated scutes in front of the large nuchals, and between them and the skull a semicircular row of six conical shields. 17 transverse series of dorsal scutes, the broadest of which are composed of six scutes. Ventrals with a thin ossification. Fingers free, toes half-webbed. Tail strongly compressed and crested posteriorly. Greenish black above, speckled and vermiculate with yellow; underparts greyish.

Total length 1 metre 74 centim.

Yang-tse-Kiang.

### 6. CAIMAN.

*Alligator*, part., *Cuvier, Ann. Mus.* x. p. 30 (1807); *Dum. & Bibr.* iii. p. 63 (1836); *Strauch, Syn. Crocod.* p. 9 (1866).

*Caiman*, *Spir., Lacert. Bras.* p. 3 (1825); *Gray, Cat. Tort. &c.* p. 66 (1844); *Huxley, Journ. Linn. Soc.* iv. p. 3 (1860); *Gray, Cat. Sh. Rept.* ii. p. 27 (1872).

*Jacaretinga*, *Spir., l. c.* p. 1.

*Champsia*, part., *Wagler, Syst. Amph.* p. 140 (1830).

*Jacare*, *Gray, Cat. Tort.* p. 64; *Huxley, l. c.* p. 4; *Gray, Cat. Sh. Rept.* ii. p. 25.

*Melanosuchus*, *Gray, Ann. & Mag. N. H.* (3) x. p. 323 (1862).

*Cynosuchus*, *Gray, l. c.*

*Paleosuchus*, *Gray, l. c.* p. 330.

*Aromosuchus*, *Gray, l. c.*

18 to 20 upper and 17 to 22 lower teeth on each side; fourth maxillary tooth longest; fourth mandibular tooth fitting into a pit in the upper jaw. Snout moderately long, or short; no bony nasal septum; nasal bones extending to the nasal aperture; supratemporal fossæ very small or absent. Splenial bones not entering the mandibular symphysis, which extends to the fourth or fifth tooth. A dorsal shield formed of six or more longitudinal series of articulated, keeled, bony scutes; a ventral armour of overlapping bony scutes, each scute formed of two distinct portions united by suture.

Central and South America.

*Synopsis of the Species.*

- I. Upper eyelid incompletely bony; supratemporal fossæ present; five teeth in each præmaxilla; 17 to 20 mandibular teeth on each side.

A. Orbit produced anteriorly to the vertical of the ninth or tenth maxillary tooth; upper eyelid flat; vomer exposed on the palate . . . . . 1. *niger*, p. 292.

B. Orbit not produced anteriorly; upper eyelid rugose, more or less distinctly raised into a small horn.

The width of the snout, on a line with the anterior borders of the orbits, equals its length; three or four transverse rows of large nuchals, only one of which is composed of four scutes . . . . . 2. *latirostris*, p. 293.

Snout longer than wide at the base; four or five transverse rows of large nuchals; all the scutes on the body, limbs, and tail bony in the adult . . . . . 3. *sclerops*, p. 294.

- II. Upper eyelid entirely bony; supratemporal fossæ obliterated; four teeth in each præmaxilla; 20 to 22 mandibular teeth on each side.

Some or all of the scutes between the hind limbs in two or three longitudinal series; caudal crest double up to the ninth or tenth verticil inclusively . . . . . 4. *trigonatus*, p. 296.

All the shields between the hind limbs in four series; caudal crest double up to the eleventh or twelfth verticil inclusively. . 5. *palpebrosus*, p. 296.

1. *Caiman niger*.

*Caiman niger*, *Spix, Lacert. Bras.* p. 3, pl. iv. (1825).

*Champsia nigra*, *Wagler, Syst. Amph.* pl. vii. fig. 1 (1830); *Natterer, Ann. Wien. Mus.* ii. p. 320, pl. xxi. (1840).

*Jacare nigra*, *Gray, Cat. Tort. &c.* p. 65 (1844), and *Tr. Zool. Soc.* vi. p. 162 (1867), and *Cat. Sh. Rept.* ii. p. 25 (1872).

— *fissipes*?, *Huxley, Journ. Linn. Soc.* iv. p. 4 (1860).

*Alligator niger*, *Strauch, Syn. Crocod.* pp. 17 & 71 (1866).

18 (or 19) upper and 17 or 18 lower teeth on each side; fourth maxillary tooth much longer than the third. Head once and three fifths to once and two thirds as long as broad; snout moderate, obtuse, a little longer than broad; a feeble transverse ridge in front of the concave interorbital region, bordering two deep concavities: two oblique ridges on each side of the snout, one from the orbit to

the fourth maxillary tooth, the other from the frontal pits to the fifth præmaxillary tooth; orbit produced anteriorly to the vertical of the ninth or tenth maxillary tooth; upper eyelid flat, finely striated above, with a small bony plate anteriorly; supratemporal fossæ present; vomer visible on the palate as a small rhomboidal plate. Four or five transverse series of small postoccipital scutes; four transverse series of large nuchals, the first two composed of four scutes, all articulated together. Dorsal shield composed of 19 transverse series of scutes, the broadest of which contain ten scutes; all strongly and sharply keeled. Ventral scutes bony and imbricate, except on the posterior abdominal region, where the ossifications are absent or reduced to a small nucleus. Fingers free, outer toes half-webbed. Black above, yellow inferiorly.

Total length 4 metres.

Tropical South America east of the Andes.

|                    |          |                       |
|--------------------|----------|-----------------------|
| a. Ad., stfild.    | Para.    | R. Graham, Esq. [P.]. |
| b, c. Ad., skulls. | Para.    | R. Graham, Esq. [P.]. |
| d. Ad., skull.     | E. Peru. | Mr. E. Bartlett [C.]. |

## 2. Caiman latirostris.

*Crocodylus latirostris*, Daud. *Rept.* ii. p. 417 (1802).

*Caiman fissipes*, Spix, *Lacert. Bras.* p. 4, pl. iii. (1825).

*Champsia fissipes*, Wagl. *Icon. Amph.* pl. xvii. (1830); Natterer, *Ann. Wien. Mus.* ii. p. 321, pl. xxii. (1840).

*Crocodylus sclerops* (non Schn.), Wied, *Abbild.* (1831).

*Alligator sclerops*, part., Gray, *Syn. Rept.* p. 62 (1831).

— *cynocephalus*, Dum. & Bibr. iii. p. 86 (1836).

*Jacare fissipes*, Gray, *Cat. Tort. &c.* p. 64 (1844).

— *latirostris*, part., Gray, *Ann. & Mag. N. H.* (3) x. p. 328 (1862), and *Tr. Zool. Soc.* vi. p. 163 (1867), and *Cat. Sh. Rept.* ii. p. 25 (1872).

*Alligator latirostris*, Strauch, *Syn. Crocod.* pp. 19 & 73 (1866); Hensel, *Arch. f. Nat.* 1868, p. 384; Burmeister, *Ann. Soc. Argent.* ix. p. 244 (1880).

18 or 19 upper and 17 or 18 lower teeth on each side; fourth maxillary tooth much longer than third. Head not more than once and a half as long as broad; snout very broad and rounded, its basal width nearly equalling its length; a strong ridge from one anterior border of the orbit to the other, more or less produced anteriorly towards the fourth maxillary tooth; orbit not produced anteriorly; interorbital space concave; upper eyelid rugose or tubercular, more or less produced into a small horn, with a small bony plate anteriorly; supratemporal fossæ present. Two more or less regular transverse series of small postoccipital scutes; three or four transverse series of large nuchals, the anterior composed of four scutes, the others of two, the transverse series separated from each other by an interspace. Dorsal shield composed of 18 transverse series of scutes, the broadest of which contain 8 or rarely 10 scutes; those of the median series very obtusely keeled in the adult. Bony

ventral shield much less developed than in the other species, only the scutes on the sternal region imbricating; the posterior abdominal region without any ossifications. Fingers free, outer toes webbed at the base. Adult uniform blackish; young olive and black, the latter colour usually predominating.

The largest specimen in the Collection measures 2 m. 5 centim.

South America east of the Andes, from the Amazon to the Rio de la Plata.

|                                          |                       |                            |
|------------------------------------------|-----------------------|----------------------------|
| <i>a, b, c, d.</i> Ad. & hgr.,<br>stfld. | Brazil.               |                            |
| <i>e-g.</i> Yg., spir.                   | Pernambuco.           | J. P. Smith, Esq. [P.].    |
| <i>h.</i> Ad., skel. (incomplete).       | Rio Grande do<br>Sul. | Dr. v. Ihering [C.].       |
| <i>i, k.</i> Hgr., skulls.               | Rio Grande do<br>Sul. | Dr. v. Ihering [C.].       |
| <i>l.</i> Ad., stfld.                    | Rio Paraguay.         | Col. Perez de Lasala [P.]. |
| <i>m-n.</i> Yg., spir.                   | Buenos Ayres.         | J. Wilks, Esq. [P.].       |
| <i>o.</i> Yg., stfld.                    | — ?                   |                            |
| <i>p.</i> Hgr., skel.                    | — ?                   |                            |
| <i>q.</i> Hgr., skull.                   | — ?                   |                            |

### 3. Caiman sclerops.

- Crocodylus sclerops*, *Schneid. Hist. Amph.* ii. p. 162 (1801); *Cuv. Ann. Mus.* x. p. 31, pls. i. & ii. (1807); *Tiedem., Opp., & Lib. Nat. Amph.* p. 60, pl. v. (1817).  
 — caïman, *Daud. Rept.* ii. p. 399 (1802).  
 — yacare, *Daud. l. c.* p. 407.  
*Jacaretinga punctulatus*, *Spir., Lacert. Bras.* p. 2, pl. ii. (1825).  
*Champsia sclerops*, *Wagl. Syst. Amph.* pl. vii. figs. 1 & 42 (1830); *Natterer, Ann. Wien. Mus.* ii. p. 321, pl. xxiii. (1840).  
*Alligator sclerops*, part., *Gray, Syn. Rept.* p. 62 (1831).  
 — *sclerops*, *Dum. & Bibr. iii.* p. 79 (1836); *Strauch, Syn. Crocod.* pp. 21 & 76 (1866); *Burmeister, Ann. Soc. Argent.* ix. p. 245 (1880).  
 — *punctulatus*, *Dum. & Bibr. t. c.* p. 91; *Strauch, l. c.* pp. 24 & 79; *Günth. Biol. C.-Am., Rept.* p. 21 (1885).  
*Champsia vallifrons*, *Natterer, l. c.* p. 322, pl. xxiv.  
 — *punctulata*, *Natterer, l. c.* p. 323, pl. xxv.  
*Jacare sclerops*, *Gray, Cat. Tort. &c.* p. 64 (1844).  
 — *punctulata*, *Gray, l. c.* p. 65, and *Cat. Sh. Rept.* ii. p. 26 (1872).  
 — *vallifrons*, *Gray, l. c.*  
 — *longiscutata*, *Gray, Ann. & Mag. N. H.* (3) x. p. 328 (1862), and *Tr. Zool. Soc.* vi. p. 164, pl. xxxiv. (1867), and *Cat. Sh. Rept.* ii. p. 26.  
 — *ocellata*, *Gray, ll. cc.* pp. 329, 164, pl. xxxiii., & p. 26.  
 — *multiscutata*, *Gray, Tr. Zool. Soc.* vi. p. 164, and *Cat. Sh. Rept.* ii. p. 26\*.

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\* I have been unable to trace the type specimen of *J. multiscutata*; and I strongly suspect that, through some oversight, this supposed species was founded upon the very specimen which had previously served as the type of *J. longiscutata*.

*Jacare latirostris*, part., *Gray, ll. cc.*

— *hirticollis*, *Gray, ll. cc.* pp. 165, 27.

Alligator (*Jacare*) *chiapasius*, *Bocourt, Journ. de Zool.* v. p. 400 (1876); *Sumichrast, Bull. Soc. Zool. France*, 1880, p. 170.

19 or 20 upper and 18 to 20 lower teeth on each side; fourth maxillary tooth much larger than third, in the adult. Head once and a half to twice as long as broad; snout more or less obtuse, its basal width less than its length; a strong ridge from one anterior border of the orbit to the other, sometimes produced anteriorly towards the fourth maxillary tooth; orbit not produced anteriorly; interorbital space concave; upper eyelid rugose or tubercular, often more or less produced into a small horn, with a small bony plate anteriorly; supratemporal fossæ present. Two or three more or less regular transverse series of small postoccipital scutes; four or five transverse series of large nuchals, all articulated together, usually two or three of which are composed of four scutes. Dorsal shield composed of 18 or 19 transverse series of scutes, the broadest of which contain 8 or 10 scutes; those of the median series very obtusely keeled in the adult. Bony ventral shield much developed; the scutes of the outer rows obtusely keeled. All the scutes of the body, limbs, and tail bony in the adult. Fingers free, toes webbed at the base. Adult uniform blackish; young pale olive, dotted and spotted, or cross-barred, with brown or black.

The largest specimen in the Collection measures 2 m. 60 centim.

Central and South America, from the isthmus of Tehuantepec to the Rio de la Plata.

|                                       |                                     |                                    |
|---------------------------------------|-------------------------------------|------------------------------------|
| <i>a, b, c.</i> Hgr. & yg.,<br>stffl. | Tonala Valley, Chiapas.             | F. Sumichrast [C.].                |
| <i>d.</i> Yg., stffl.                 | Tapana, Tehuantepec.                | F. Sumichrast [C.].                |
| <i>e.</i> Hgr., stffl.                | Huamuchal, Guatemala.               | O. Salvin, Esq. [P.].              |
| <i>f.</i> Yg., spir.                  | Demerara.                           | W. Carruthers, Esq. [P.].          |
| <i>g.</i> Yg., spir.                  | Demerara.                           |                                    |
| <i>h, i, k.</i> Hgr. & yg.,<br>stffl. | Demerara.                           |                                    |
| <i>l.</i> Yg., spir.                  | Surinam.                            |                                    |
| <i>m, n.</i> Hgr. & yg.,<br>skins.    | Surinam.                            |                                    |
| <i>o.</i> Ad., stffl.                 | Brazil.                             |                                    |
| <i>p.</i> Yg., spir.                  | Brazil.                             |                                    |
| <i>q.</i> Ad., stffl.                 | Paraguay.                           | T. J. Hutchison, Esq.<br>[P.].     |
| <i>r.</i> Yg., stffl.                 | Sta. Cruz de la Sierra,<br>Bolivia. | (Type of <i>J. ocellata</i> .)     |
| <i>s.</i> Ad., stffl.                 | Argentine Republic.                 | W. D. Christie, Esq. [P.].         |
| <i>t.</i> Ad., stffl.                 | Argentine Republic.                 |                                    |
| <i>u.</i> Yg., stffl.                 | —?                                  | (Type of <i>J. longiscutata</i> .) |
| <i>v, w.</i> Hgr., stffl.             | —?                                  |                                    |
| <i>x.</i> Hgr., skull.                | —?                                  |                                    |



4. *Caiman trigonatus*.

*Crocodylus trigonatus*, *Schneid. Hist. Amph.* ii. p. 161 (1801);  
*Tiedem., Opp., & Lib. Nat. Amph.* p. 66, pl. vii. (1817).

— *palpebrosus*, var. 2, *Cuvier, Ann. Mus.* x. p. 35, pl. ii. fig. 1  
 (1807).

*Alligator palpebrosus*, var. b, *Gray, Syn. Rept.* p. 63 (1831); *Dum.*  
*& Bibr.* iii. p. 72 (1835).

*Champsia trigonata*, *Natterer, Ann. Wien. Mus.* ii. p. 323, pl. xxvi.  
 (1840).

*Caiman trigonatus*, *Gray, Cat. Tort. &c.* p. 66 (1844), and *Sh. Rept.*  
 ii. p. 28 (1872).

*Alligator trigonatus*, *Strauch, Syn. Crocod.* pp. 27 & 82 (1866).

19 or 20 upper and 20 to 22 lower teeth on each side; third and fourth maxillary teeth largest. Head once and three fourths to twice as long as broad; snout subacuminate, its basal width contained once and a half to twice in its length; no cross-ridge in front of the interorbital region, which is but slightly concave; upper eyelid flat and smooth, entirely bony, the bony plate consisting of four distinct pieces; supratemporal fossæ obliterated. A single series of postoccipital scutes, followed by four or five transverse series of large, very highly and sharply keeled nuchals, each composed of two or sometimes of three or four scutes. Dorsal scutes in 18 or 19 transverse series, the broadest of which are composed of six scutes; some or all of the posterior (between the hind limbs) composed of two or three scutes only; the dorsal scutes, except the two median series, very strongly and highly keeled. The caudal crest becomes single on the tenth or eleventh verticil. Dorsal and ventral bony armour much developed; sides of body soft, with scattered small bony tubercles; gular and outer ventral scutes keeled. Fingers free, toes webbed at the base. Yellowish brown above, spotted and cross-barred with black.

Total length 1 m. 40 centim.

Tropical South America east of the Andes.

|                    |                          |                       |
|--------------------|--------------------------|-----------------------|
| a. Hgr., stfd.     | Guianas.                 |                       |
| b. Ad., skull.     | Surinam.                 |                       |
| c. Hgr., spir.     | Demerara Falls.          |                       |
| d. Hgr., spir.     | Huallaga River, E. Peru. | Mr. E. Bartlett [C.]. |
| e. Hgr., skull.    | Moyombamba, E. Peru.     | Mr. A. H. Roff [C.].  |
| f-h, i. Yg., spir. | —?                       |                       |

5. *Caiman palpebrosus*.

*Crocodylus palpebrosus*, var. 1, *Cuvier, Ann. Mus.* x. p. 35, pl. i.  
 fig. 6, & pl. ii. fig. 2 (1807).

— *palpebrosus*, *Tiedem., Opp., & Lib. Nat. Amph.* p. 64, pl. vi.  
 (1817).

*Jacaretinga moschifer*, *Spix, Lacert. Bras.* p. 1, pl. i. (1825).

*Alligator palpebrosus*, var. a, *Gray, Syn. Rept.* p. 63 (1831); *Dum.*  
*& Bibr.* iii. p. 69 (1835).

*Champsia palpebrosa*, *Natterer, Ann. Wien. Mus.* ii. p. 324, pl. xxvii.  
 (1840).

*Champsä gibbiceps*, *Natterer*, l. c. pl. xxviii.

*Caiman palpebrosus*, *Gray*, *Cat. Tort. &c.* p. 67 (1844), and *Sh. Rept.* ii. p. 28 (1872).

— *gibbiceps*, *Gray*, *Cat. Tort. &c.*, p. 67.

*Alligator palpebrosus*, *Strauch*, *Syn. Crocod.* p. 25 (1866).

19 or 20 upper and 20 lower teeth on each side; third and fourth maxillary teeth largest. Head once and three fifths to once and two thirds as long as broad; snout subacuminate, its basal width contained about once and a half in its length; no cross-ridge in front of the interorbital region, which is but slightly concave; upper eyelid flat and smooth, entirely bony, the bony plate consisting of four distinct pieces; lores very steep and high; canthus rostralis angular; supratemporal fossæ obliterated. Two transverse series of postoccipital scutes, followed by four or five transverse series of large, very highly and sharply keeled nuchals, the second and third usually composed of three or four scutes, the others of two. Dorsal scutes in 18 or 19 transverse series, the broadest of which are composed of six or eight scutes, which are less highly keeled than in the preceding species; those between the hind limbs constantly in four longitudinal series. The caudal crest becomes single on the twelfth or thirteenth verticil. Dorsal and ventral bony armour much developed; sides of body soft, with scattered small bony tubercles; gular and outer ventral scutes keeled. Fingers free, toes webbed at the base. Yellowish-brown above, spotted and cross-barred with black.

Total length 1 m. 20 centim.

Guianas and Brazil.

*a, b.* Ad. & hgr., stffid. — ?

*c, d.* Yg., spir. — ?

The precise affinities of the following Crocodile are uncertain, as the original description does not give the number of the mandibular teeth; and as, in the unique specimen upon which the species is founded, the fourth mandibular tooth on one side is received into a notch as in true Crocodiles, and on the other into a pit, as in the Alligators, it is difficult to say to which group it belongs, although Cope suspects its affinities to be "rather more Alligatorial." It also appears to me doubtful whether the absence of the claw in the third finger will prove a constant character.

#### PEROSUCHUS.

*Cope*, *Proc. Ac. Philad.* 1868, p. 203, and *Tr. Am. Phil. Soc.* (2) xiv. p. 83 (1870).

"Toes 5—4, with claws two—three. No osseous nasal septum or bony eyelid. Belly protected by series of osseous plates, as well as the back."

## PEROSUCHUS FUSCUS.

*Cope, ll. cc. figs.*

Snout broad and flat, rounded at the end, without any ridges. A transverse row of six small anterior nuchals; the large nuchals in four transverse rows, all of four scutes except the last. Dorsal scutes, six or eight in each transverse row. Fingers free, toes half-webbed. No posterior crest on arm or leg. Tail short, with remarkably low crest. Colour above dark brown, almost black on the upper surface of the head; tail paler, light olive-brown; eyelids and a band through the ear yellow; lower surfaces everywhere bright yellow.

Total length 73 centim.

Magdalena River, Colombia.

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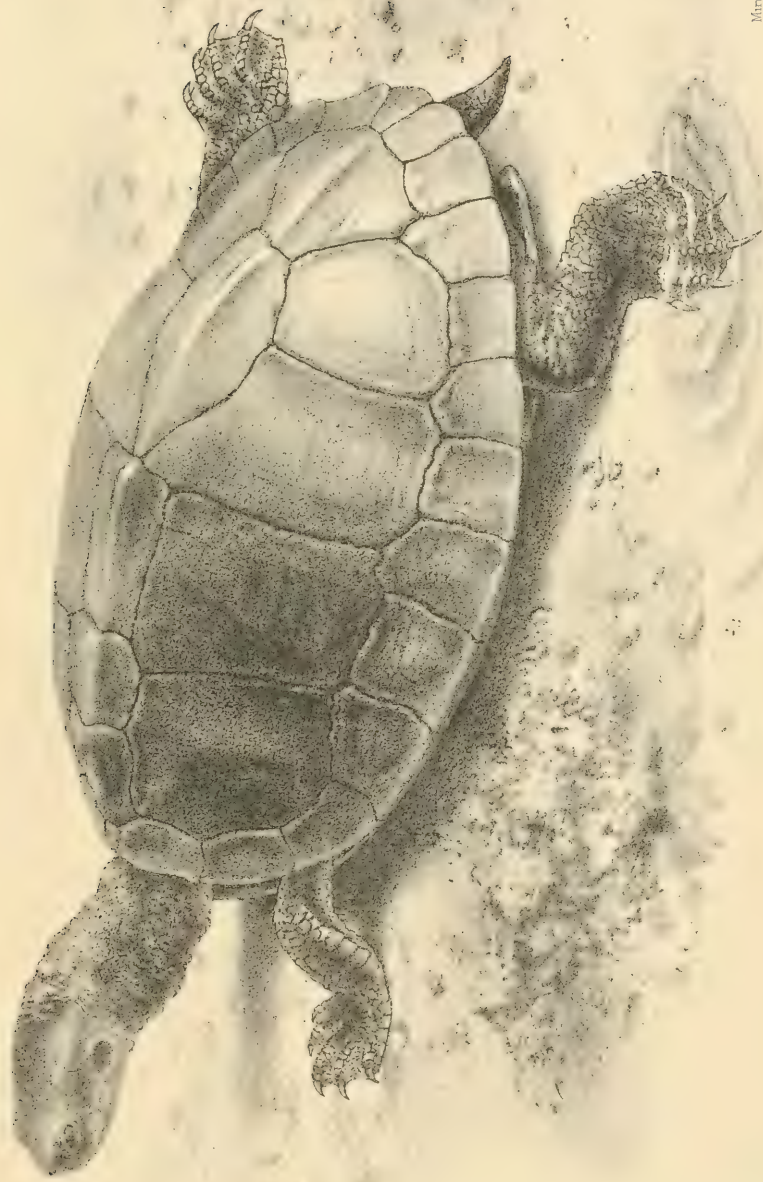
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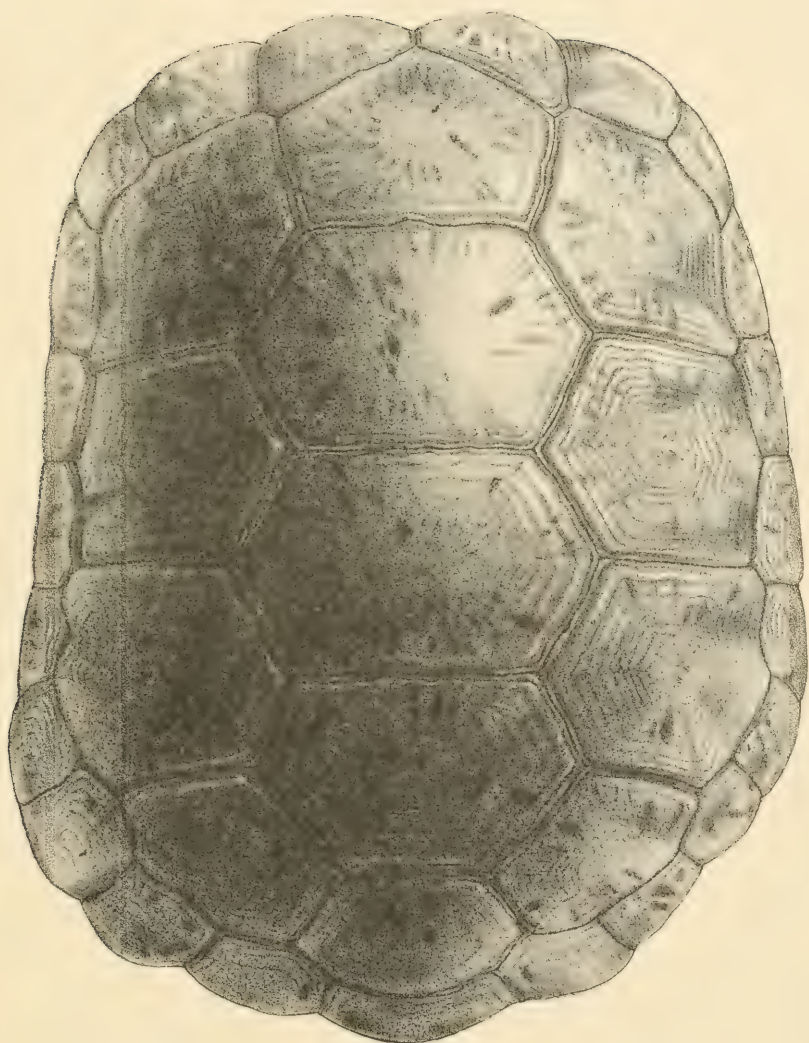


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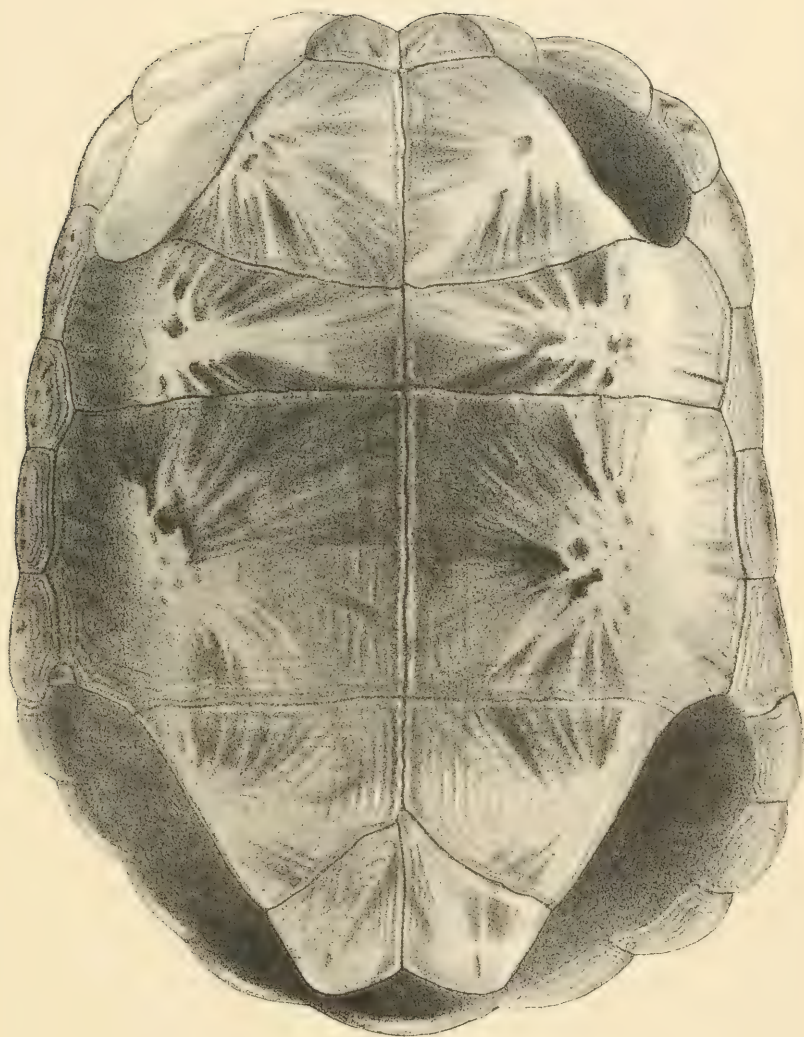




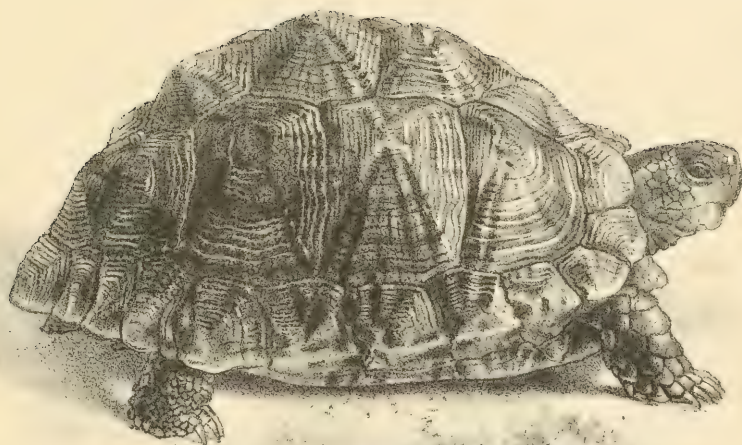
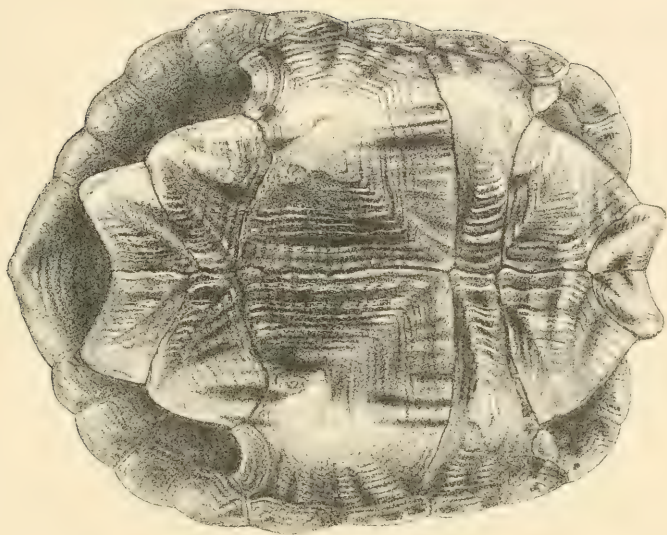






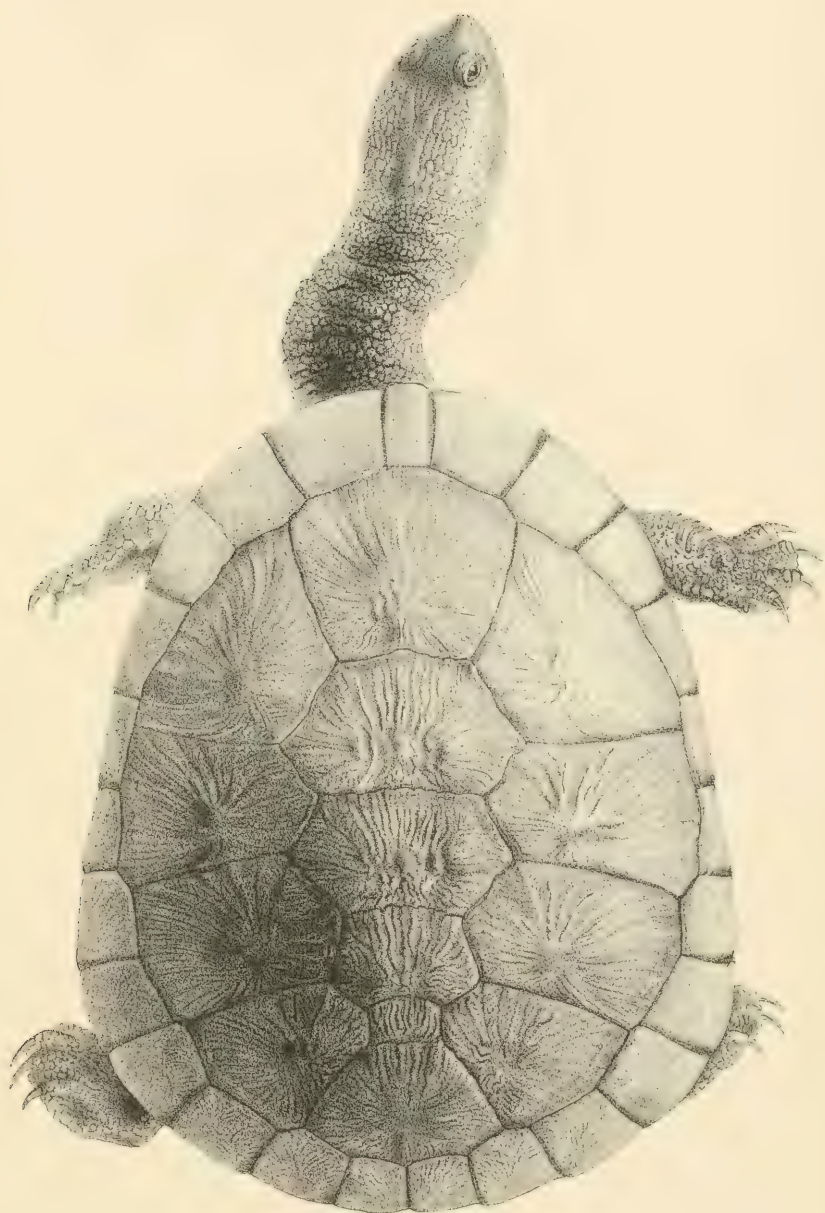




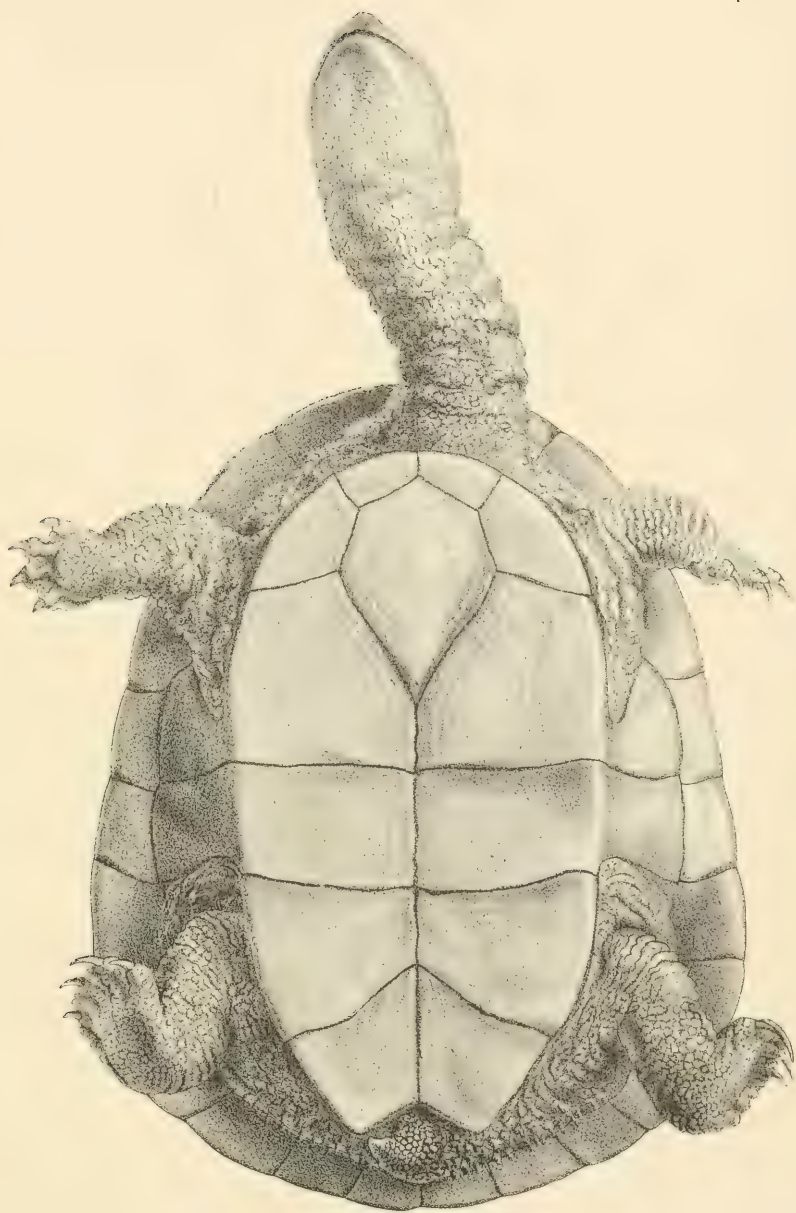












Peter Smut del. et lith.

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Mintern Bros. imp.

*Chelodina novæ-guinææ.*













